SONY

オーディオカセットデュプリケーター

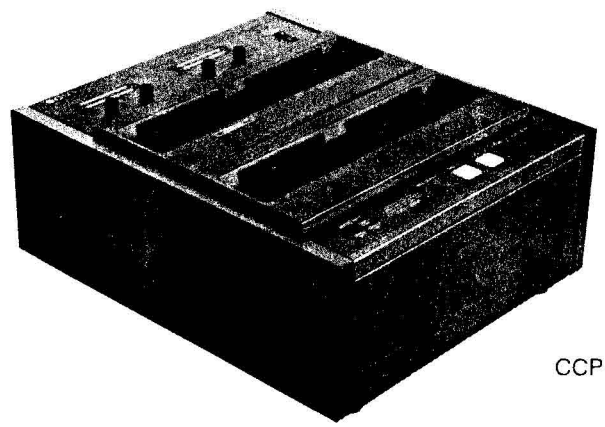
AUDIO CASSETTE DUPRICATOR

CCP-2310F
CCP-2410F

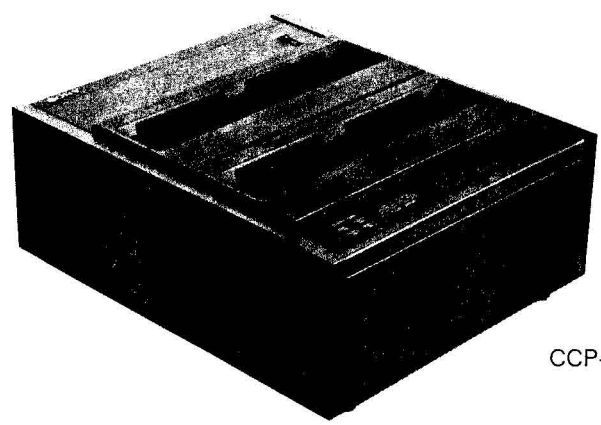
SERVICE MANUAL

補修部品表

1st Edition



CCP-2310F



CCP-2410F

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第1章
概　要

1-1. 概略仕様

電　源	AC100V, 50/60Hz
消費電力	64W
トラック方式	4トラック 4チャンネル／4トラック 2チャンネル
使用カセット	TYPE Ⅰ（ノーマル）カセット (C-30, C-46, C-60, C-90等) (TYPE Ⅱ, TYPE Ⅳカセットは使用不可)
テープ速度	76cm/s
コピー時間	約2分（カセットC-60にて）
巻き戻し時間	約45秒（カセットC-60にて）
周波数特性	40-10,000Hz
録音バイアス周波数	約550kHz
S/N比	49dB以上 (JIS-A, WRMS, 最大録音レベル時)
総合ひずみ率	3%以下
ワウフラッター	0.23%以下（WRMS）
クロストーク	53dB以上（トラック2-3間, 1kHz）
ラインコントロール	13ピンDINコネクター
端　子	CCP-2310F :ライン出力端子 （13ピンDINコネクター） CCP-2410F :ライン入力端子 （13ピンDINコネクター), ライン出力端子 （13ピンDINコネクター）
外形寸法	約328×160×382mm(幅/高さ/奥行き) (突起物含まず)
質　量	約10.2kg
付属品	電源コード（1） ヘッドクリーニング棒（1組） ダストカバー（1） 取扱説明書（1） 保証書（1） サービス窓口のしおり（1） 音声信号/コントロール信号接続ケーブル（13ピンDINコネクター→13ピンDINコネクター）（1）（CCP-2410Fのみ）

1-2. 特　長

オーディオカセットデュプリケーターCCP-2310F

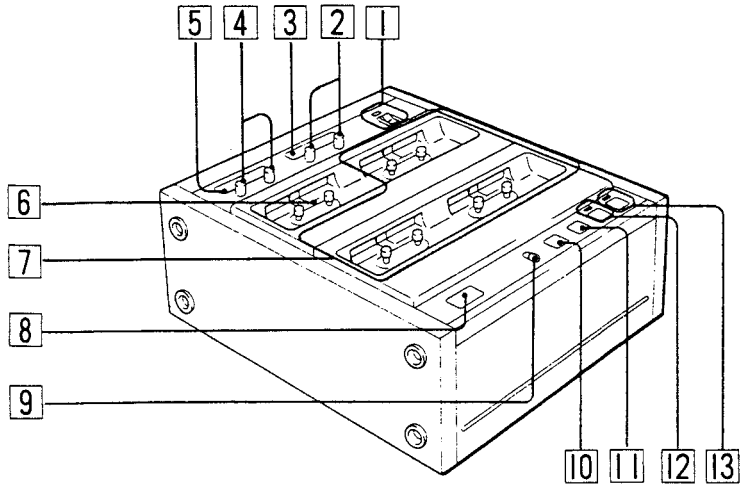
- 同時に3巻のカセットにコピーできる16倍速の高速カセットデュプリケーター。
- 両面同時コピー、片面コピーの切り換えができるSIDE SELECT（サイド セレクト）スイッチつき。
- ボタン1つで、テープの巻き戻し→コピー→巻き戻し→停止の一連の動作が自動的に行える、AUTO COPY（オート コピー）機能つき。
- コピー用テープがオリジナルテープより短かった場合には、SHORT TAPE（ショート テープ）インジケーターが点灯し、コピーが完全に行われたかどうかをチェックする必要があることを表示。
- トラック別にレベル調節ができるレベルメーターとレベル調節つまみつき。
- 必要なコピーカセット数に応じて、CCP-2410Fが10台まで接続可能。
- 耐久性に優れたフェライトヘッドを使用。
- 各リールに2リールモーターダイレクトドライブシステムを採用。
- コピーが終ると音が出るエンドアラーム機能つき。
- ヘッド部に静電気雑音防止用ブラシつき。

オーディオカセットデュプリケーターCCP-2410F

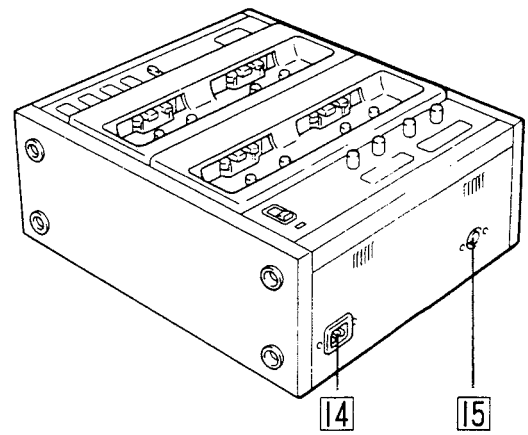
- コピー用カセットが4巻入る、コピー専用16倍速高速デュプリケーター。
- CCP-2410Fの動作はすべて、CCP-2310Fのボタン操作でコントロールされます。
- 耐久性に優れたフェライトヘッドを使用。

1-3. 各部の名称と働き

CCP-2310F



後面



1 POWER（電源）スイッチとインジケーター
スイッチをONにすると電源が入り、インジケーターが点灯します。SHORT TAPEインジケーターも同時に点灯します。約4秒後にSHORT TAPEインジケーターが消え、操作準備が完了します。

2 B面再生レベル調節つまみ
オリジナルテープのB面の再生音の出力レベルを調節します。L（Left）つまみで左チャンネルを、R（Right）つまみで右チャンネルを調節します。通常は各つまみともセンターに合わせておきます。「MAX」の方へ回すと再生レベルが上がり、「MIN」の方へ回すと下がります。

3 B面再生レベルメーター
オリジナルテープのB面の再生出力レベルを示します。Lメーターは左チャンネルの再生出力レベルを、Rメーターは右チャンネルの再生出力レベルを示します。

4 A面再生レベル調節つまみ
オリジナルテープのA面の再生音の出力レベルを調節します。L（Left）つまみで左チャンネルを、R（Right）つまみで右チャンネルを調節します。通常は各つまみともセンターに合わせておきます。「MAX」の方へ回すと再生レベルが上がり、「MIN」の方へ回すと下がります。

5 A面再生レベルメーター
オリジナルテープのA面の再生出力レベルを示します。Lメーターは左チャンネルの再生出力レベルを、Rメーターは右チャンネルの再生出力レベルを示します。

6 ORIGINALカセット入れ

7 COPYカセット入れ、1、2、3

8 SHORT TAPE（ショート・テープ）インジケーター
コピー中、オリジナルテープより先にコピー用テープが終わってしまった場合、点灯します。（1-6ページ「SHORT TAPEインジケーターについて」参照。）また、コピー用テープがカセット入れに入っていないときも点灯します。STOP以外のボタンを押すと、インジケーターが消えます。

9 SIDE SELECT（コピー面切り換え）スイッチ
片面コピー、両面コピーを切り換えます。接続されているコピー機も自動的に切り換わります。
A：片面（上側の面）のみコピーするとき。
A+B：両面同時にコピーするとき。

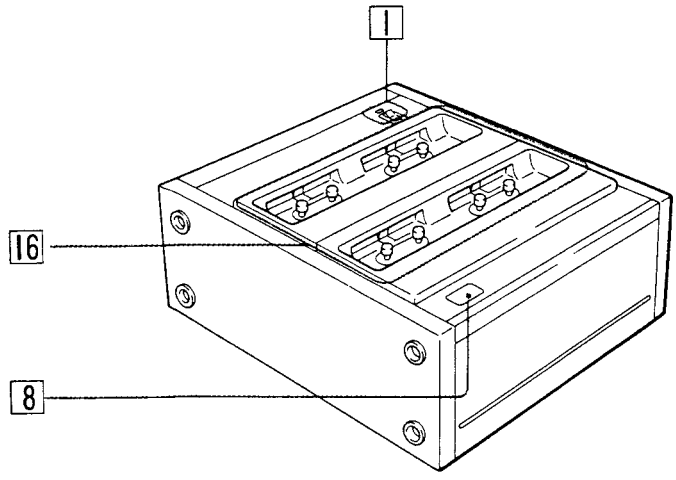
10 REWIND（巻き戻し）ボタン
テープを巻き戻すとき押します。それぞれのテープの頭で自動的に止まります。接続したコピー機のテープも巻き戻されます。

11 STOP（停止）ボタン
テープを止めるときに押します。接続したコピー機のテープも停止します。

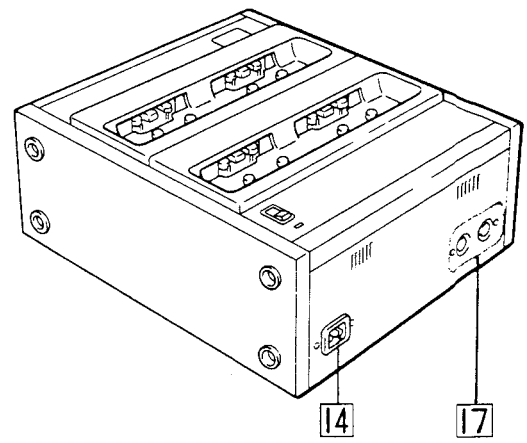
12 COPY（コピー）ボタンとインジケーター
コピーを始めるとき押します。インジケーターが点灯し、オリジナルカセットは再生、コピー用カセットは録音になります。接続したコピー機のカセットも録音状態になります。オリジナルのテープが終わると全てのテープが止まりインジケーターが消えアラームが鳴ります。

CCP-2410F

1、8、14のつまみはCCP-2310Fのつまみと同じ働きをします。



後面



13 **AUTO COPY（オートコピー）ボタンとインジケーター**
テープを巻き戻してからコピーを始めるとき押します。インジケーターが点灯し、すべてのテープが頭まで巻き戻された後、COPY インジケーターも点灯し、オリジナルカセットは再生、コピー用カセットは録音になります。接続したコピー機のカセットも録音状態になります。コピーが終わり、すべてのテープが止まるとCOPYインジケーターが消えます。AUTO COPY インジケーターは点灯したまますべてのテープが巻き戻されます。ただし、SHORT TAPEインジケーターが点灯しているテープは巻き戻されません。終了すると AUTO COPYインジケーターが消えて、アラームが鳴ります。

14 **AC IN（電源入力）ソケット**
付属の電源コードをつなぎます。

15 **LINE/CONTROL OUTPUT(ライン/コントロール出力)端子**
(13ピンDINコネクター)
接続したコピー機にオリジナルテープの音声信号やコントロール信号を送り出します。CCP-2410F の LINE/CONTROL INPUT端子とつなぎます。

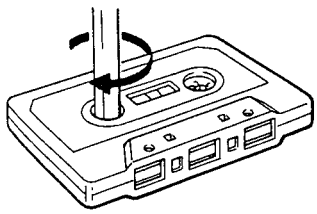
16 **COPYカセット入れ1、2、3、4**

17 **LINE/CONTROL（ライン/コントロール）端子**
(13ピンDINコネクター)
INPUT
オリジナル機の音声信号やコントロール信号を受け取る端子です。
OUTPUT
オリジナル機の音声信号やコントロール信号を次の CCP-2410Fに送り出す端子です。

1-4. 準 備

カセットの入れかた

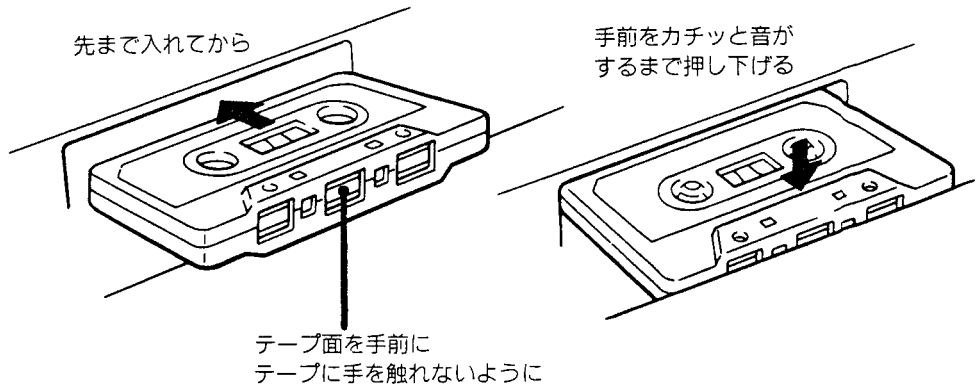
1 **テープのたるみをとります。**



2 **カセットの面を確認します。**

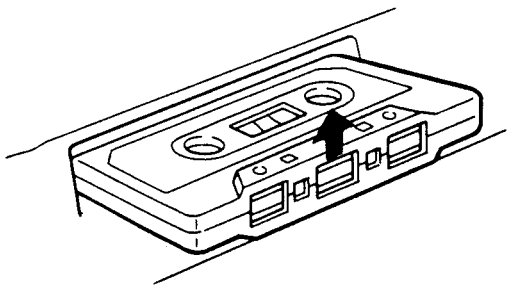
両面コピーのとき：オリジナルカセットのA面をコピー用カセットのA面に録音したいときは、両カセットの同じ面を上に向けて入れます。

片面コピーのとき：コピーしたい面を上に向けてカセットを入れます。



取り出しかた

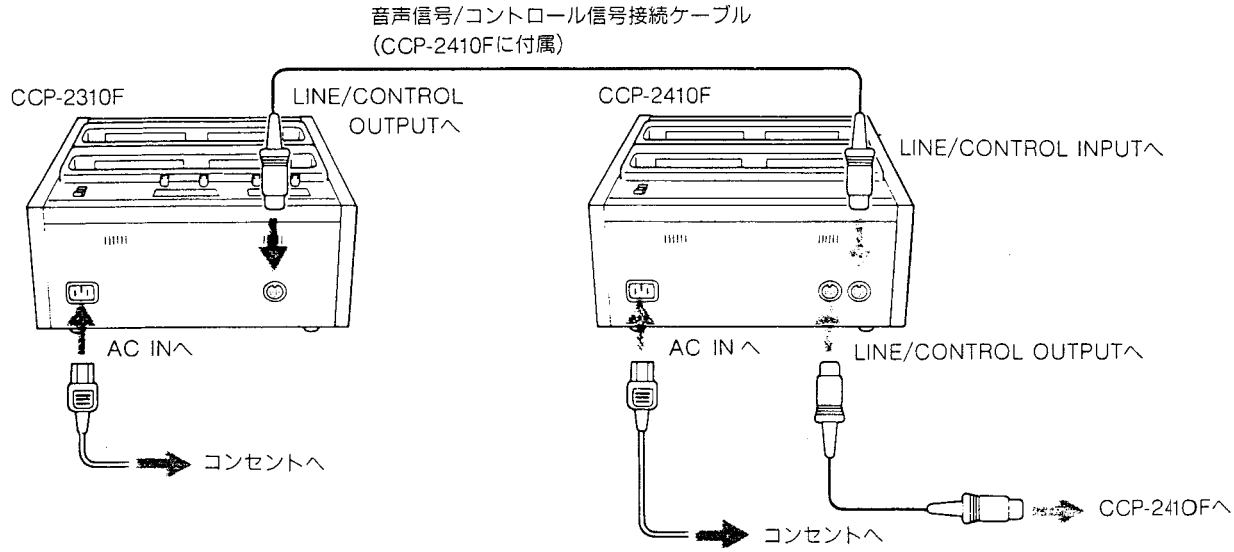
手前を持ち上げてから取り出す



カセットについてのご注意

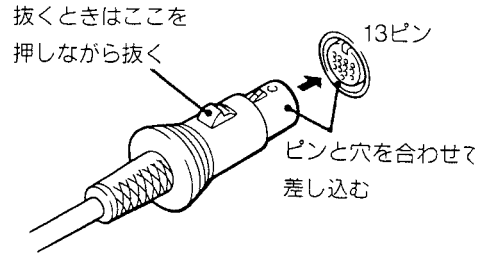
- TYPE Ⅰ（ノーマル）カセットをお使いください。他のタイプのカセットはご使用になれません。
- コピー用にはオリジナルカセットと録音時間が同じ長さのカセットをお使いください。同じ長さのカセットでもメーカーや種類によって多少長さが異なる場合があります。特に両面同時にコピーするときにはオリジナルカセットと同じ長さ、メーカー、種類のカセットをお使いください。オリジナルカセットのテープの長さいっぱいに録音されていて、コピー用カセットが多少短い場合には、録音内容が切れてしまうことがあります。
- 120分テープのご使用はおすすめできません。120分テープは非常に薄く、伸びやすいので、こきざみな走行、停止によってテープが機械に巻き込まれる場合があります。
- デュプリケーターは、誤消去防止のためについているカセットの“ツメ”が折ってあっても録音されるようになっていますのでご注意ください。
- マスターテープの使用回数について
  マスターテープは使用回数が多過ぎると、テープを傷め正常な録音ができません（100回以上使用すると10kHzで数dB劣化）。同じマスターテープを100回以上コピーする場合にはマスターテープを数巻ご用意ください。

接続のしかた



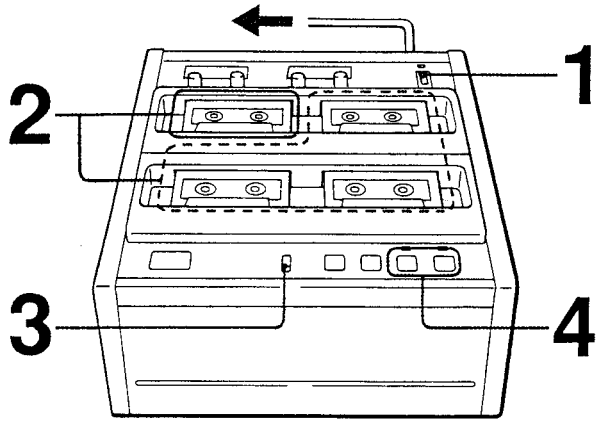
・コピー専用デュプリケーターCCP-2410Fを10台まで連続してつなぐことができます。
各デュプリケーターの電源コードは、それぞれACコンセントに差し込みます。
・接続する前に、電源が切ってあることを確認してください。

音声信号/コントロール信号接続ケーブル

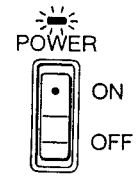


1-5. コピーするには

コピーを始める前に、約5分間ウォーミングアップをすることをおすすめします。
ウォーミングアップをしている間にヘッドを清掃することができます。



1 POWERスイッチをONにします。インジケーターが点灯します。(電源を入れてから約4秒間は、操作ボタンを押しても動作しません。)



途中でテープを止めるには、STOPボタンを押します。

コピーをせずにテープの巻き戻しだけをするには、巻き戻したいカセットだけを入れ、REWINDボタンを押します。テープの頭まで巻き戻されると自動的に止まります。

再生レベル調節

一般的には、オリジナルテープと同じレベルでコピーされるように、再生レベル調節つまみをセンターに合わせておきます。オリジナルテープのレベルが低い、または高い場合は、レベルメーターでピークレベルが「0」から「+3」の位置になるように再生レベルを調節してください。

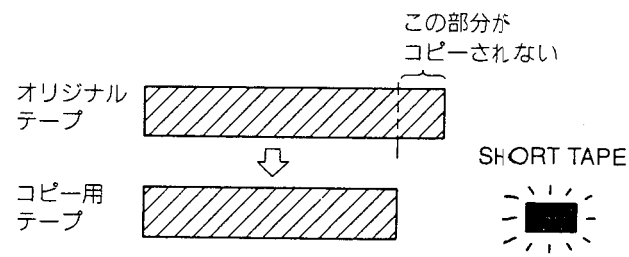
別のコピー機(CCP-2410F)を接続して使うには

接続したコピー機の各POWERスイッチをONにして、コピー用カセットを入れます。これでCCP-2310Fのコピー用カセットと同時にコピーできます。

SHORT TAPEインジケーターについて

SHORT TAPEインジケーターは、コピー用テープがオリジナルテープより短かった場合に点灯します。その場合オリジナルテープの内容が完全にコピーされていない恐れがあり、コピーが完全かどうかチェックする必要があることを示します。

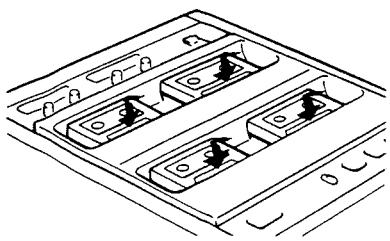
コピー中、オリジナルテープより先にコピー用テープが終わっても、オリジナルテープはそのまま走り続けます。STOP以外のボタンを押すと、インジケーターが消えます。



ご注意

オリジナルテープの音声の終わりとコピー用テープの終わりの時間差がごくわずかな場合、最後までコピーされていてもSHORT TAPEインジケーターが点灯することがあります。(同じタイプのテープでも、テープの長さのバラツキにより、このような現象が起こることがあります。)コピー用カセットを取り出し、別のカセットレコーダーなどで最後の部分を再生し、確認してください。

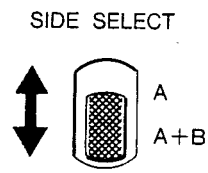
2 オリジナルカセットとコピー用カセットを入れます。



3 SIDE SELECTスイッチを合わせます。

A：片面コピーのとき

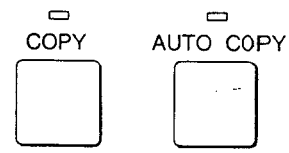
A+B：両面コピーのとき



4 AUTO COPYボタンまたはCOPYボタンを押してコピーを始めます。

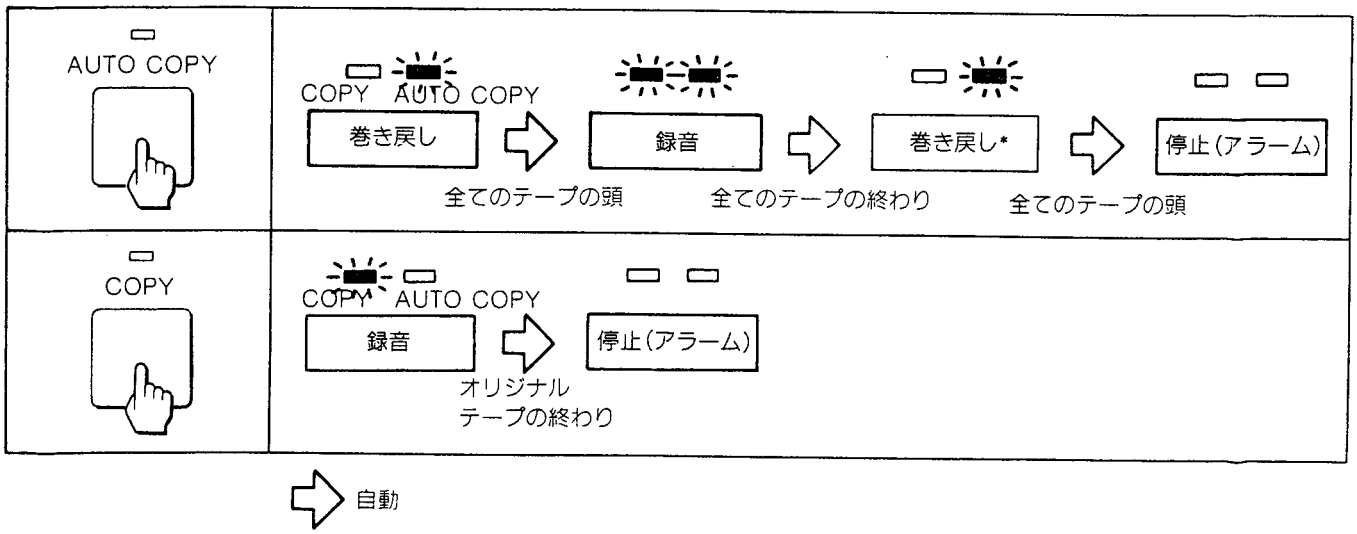
AUTO COPY：それぞれのテープの頭まで巻き戻してから自動的にコピーを始め、再び巻き戻すとき

COPY：巻き戻しをせずに、すぐにコピーを始めるとき



下の表参照

AUTO COPYボタンまたはCOPYボタンを押したときのテープの動きは、次の表のようになります。

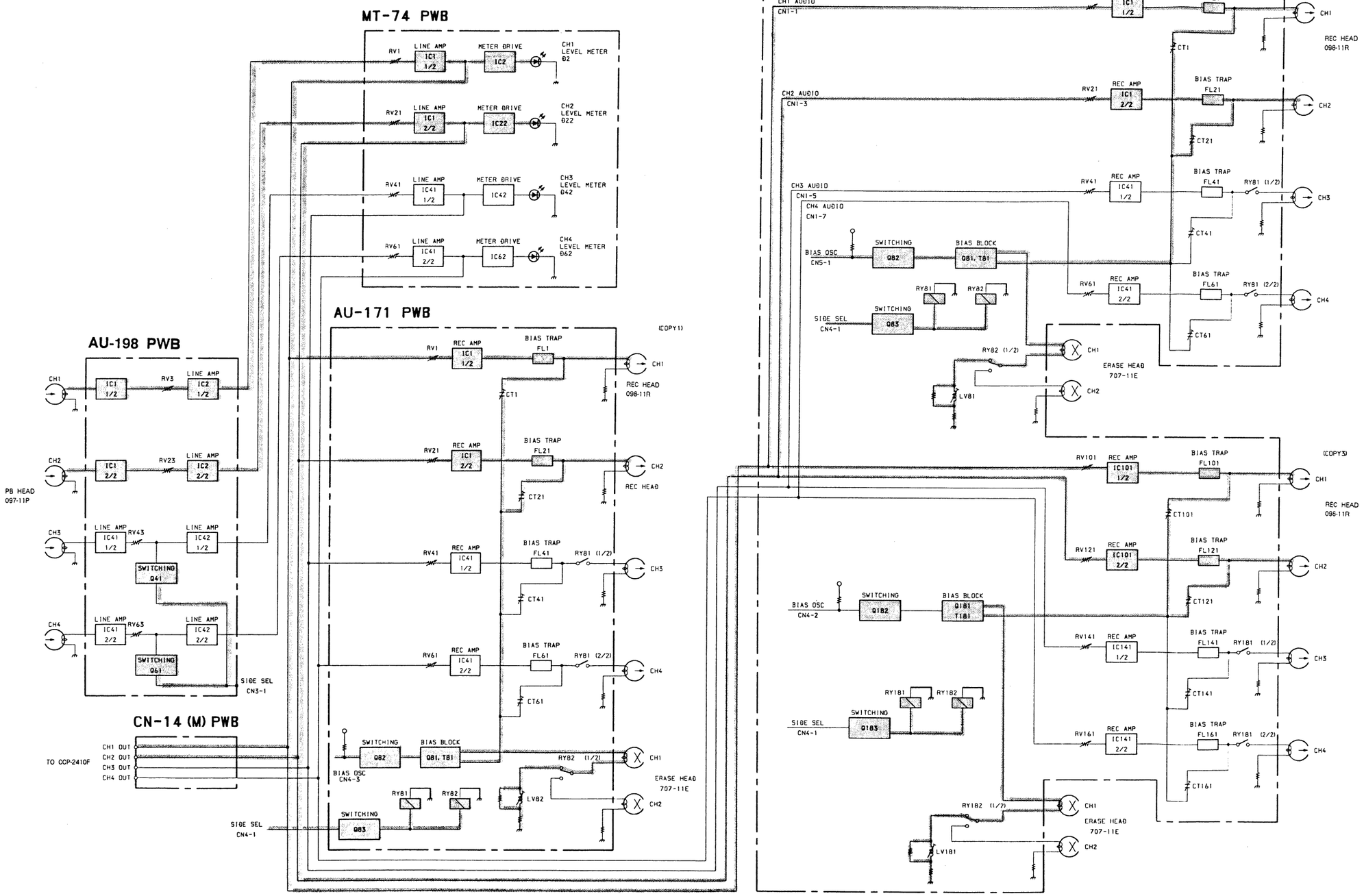


*SHORT TAPE インジケーター点灯時はコピー用テープは巻き戻しされず、停止したままになります。

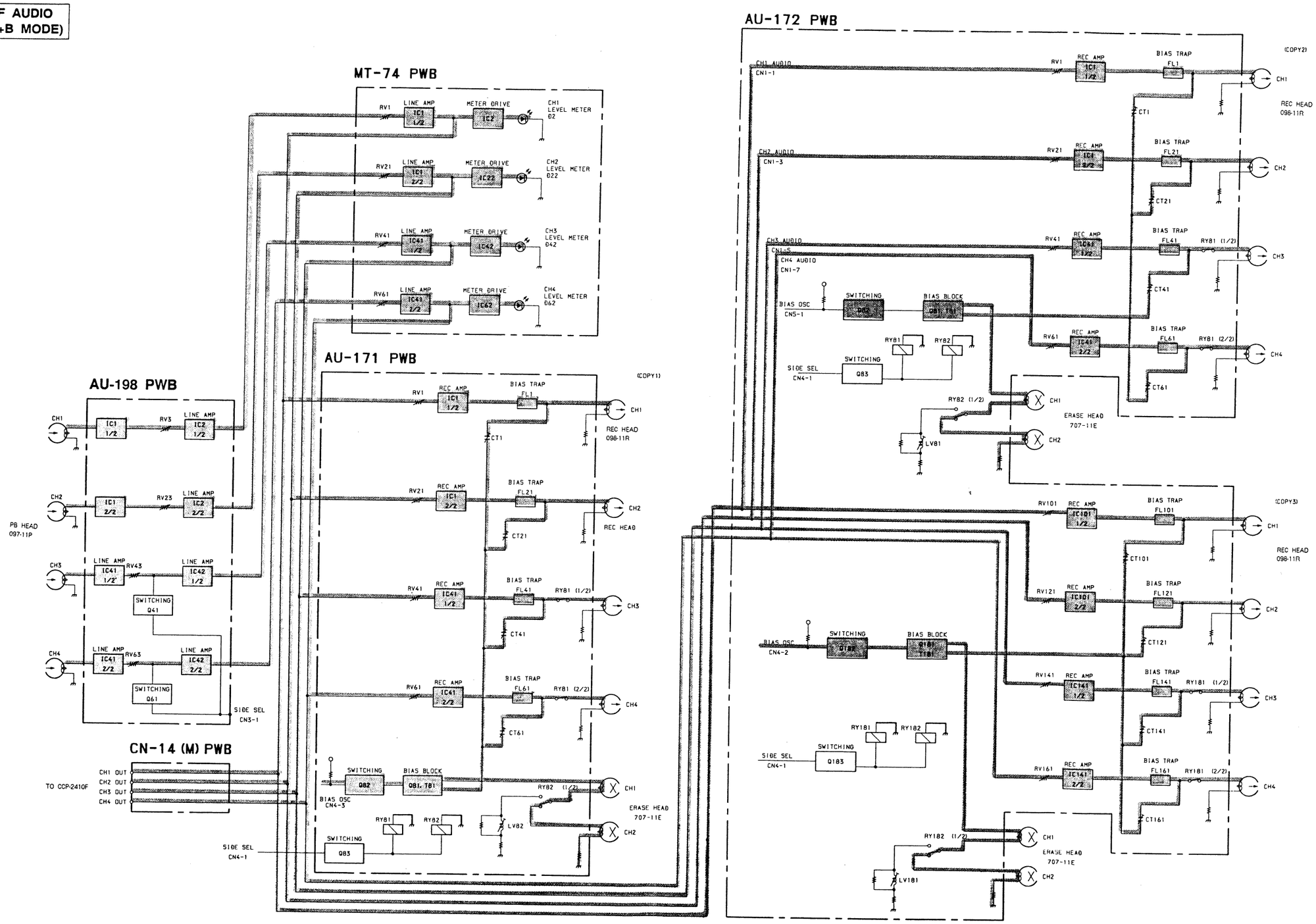
第２章
回路説明

2-1. 信号の流れ

CCP-2310F AUDIO (COPY A MODE)

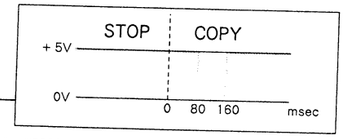


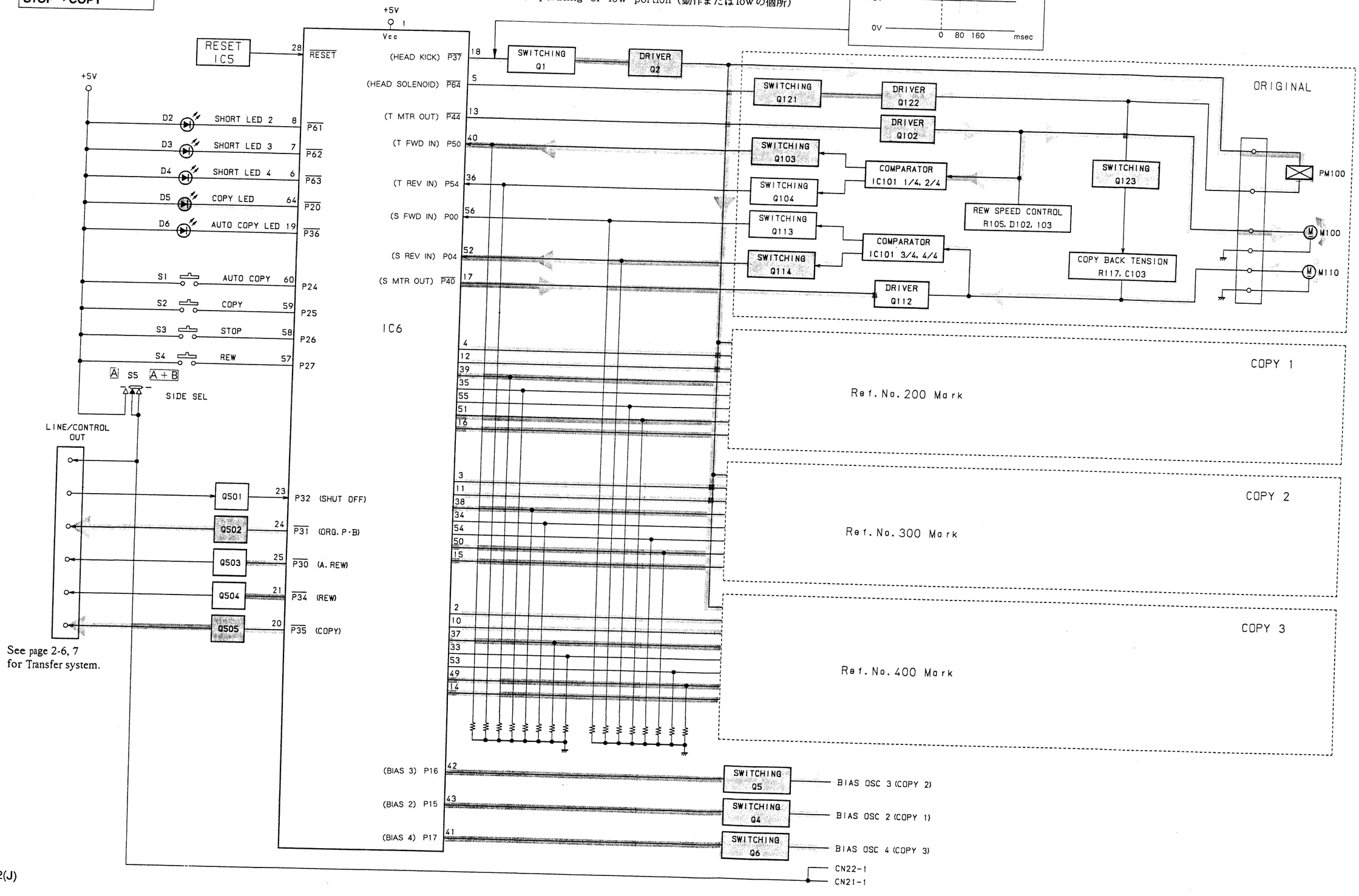
CCP-2310F AUDIO (COPY A+B MODE)



CCP-2310F CONTROL
STOP→COPY

; Operating or high portion (動作またはhighの個所)
; Operating or low portion (動作またはlowの個所)

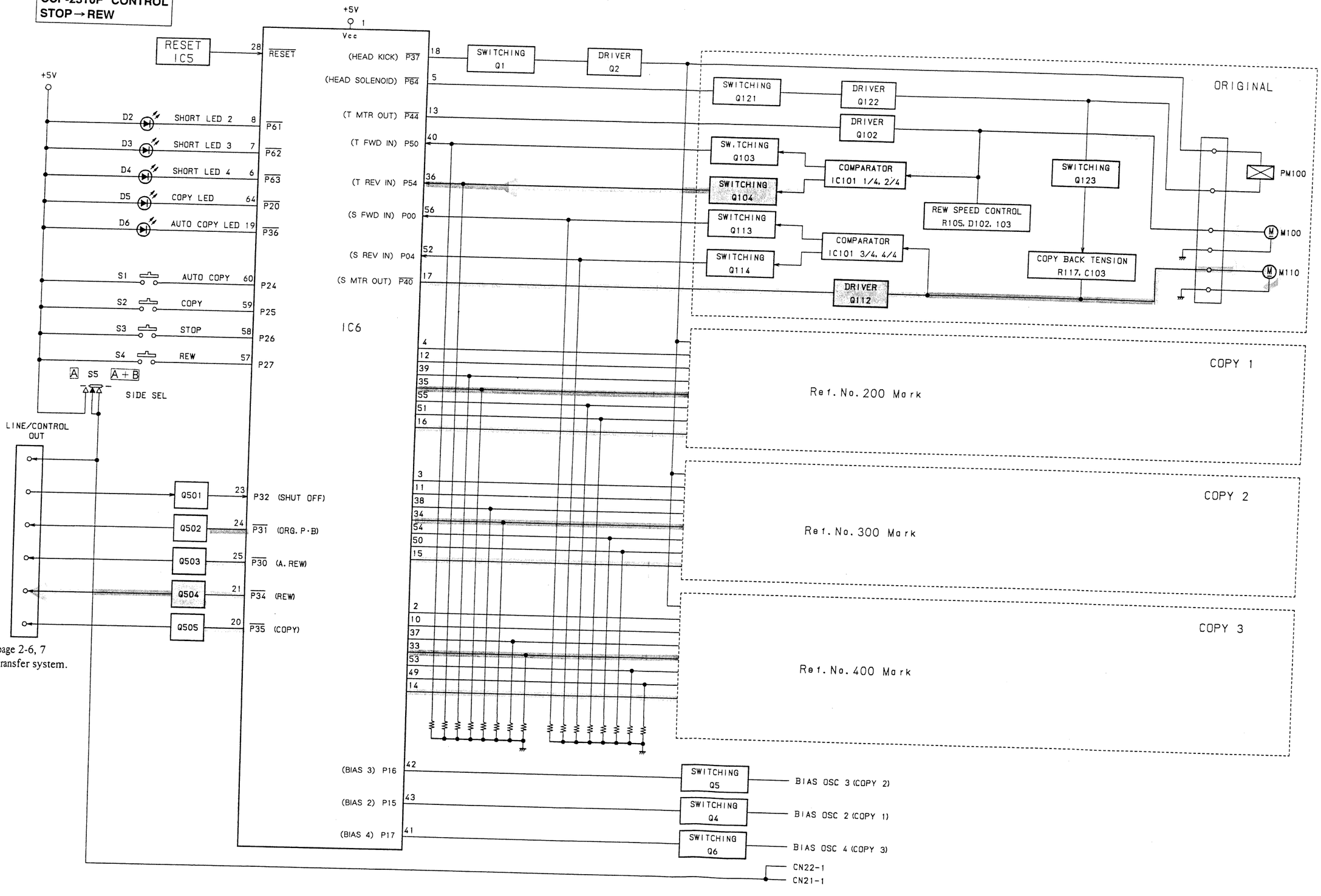




See page 2-6, 7 for Transfer system.

See page 2-6, 7 for Transfer sys

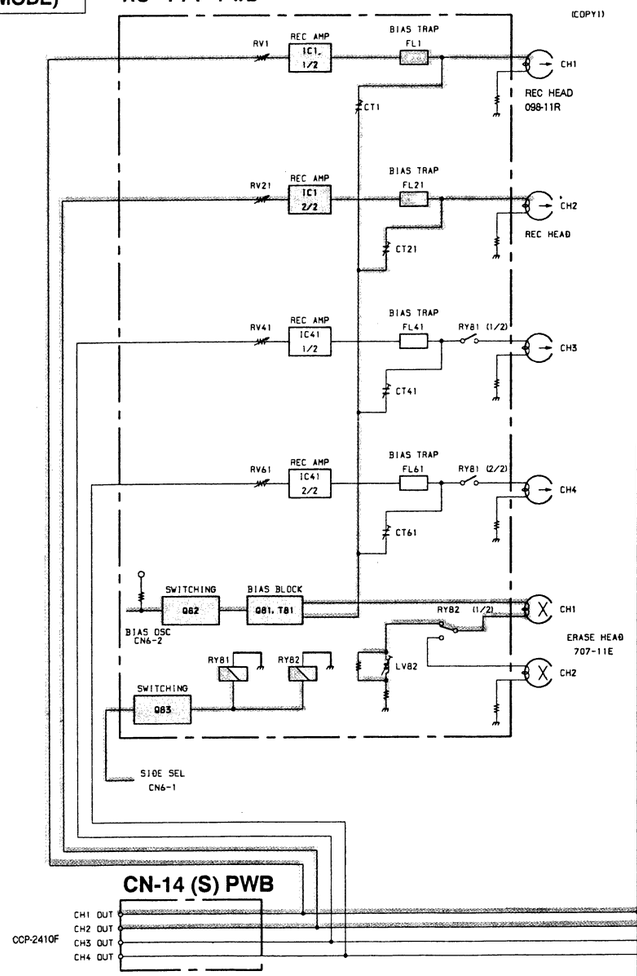
CCP-2310F CONTROL
STOP → REW



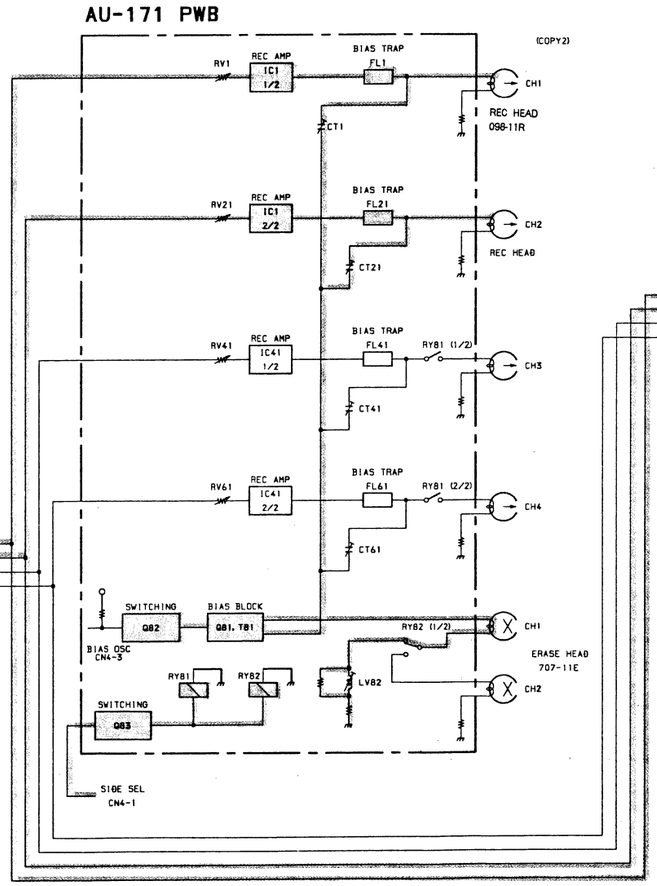
See page 2-6, 7 for Transfer system.

CCP-2410F AUDIO (COPY A MODE)

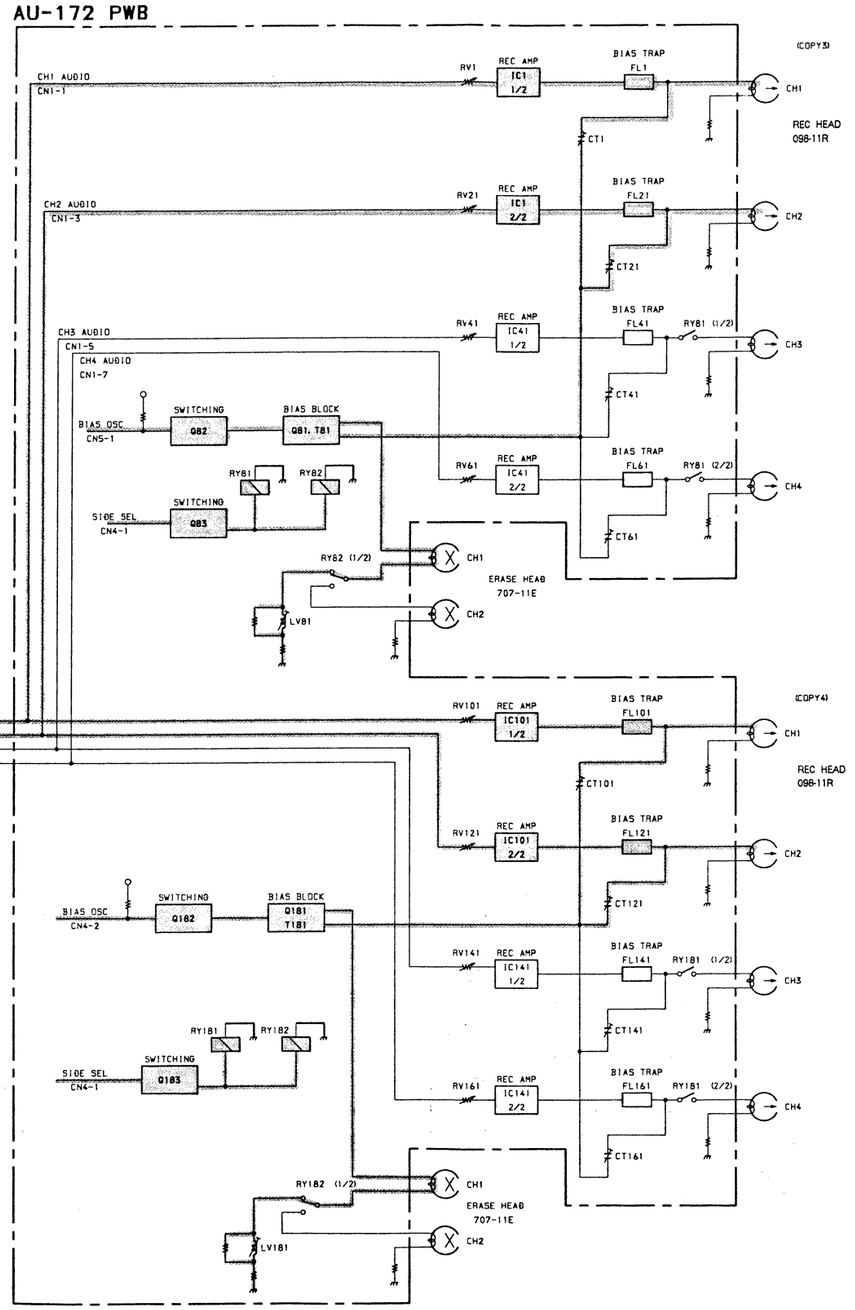
AU-171 PWB



AU-171 PWB

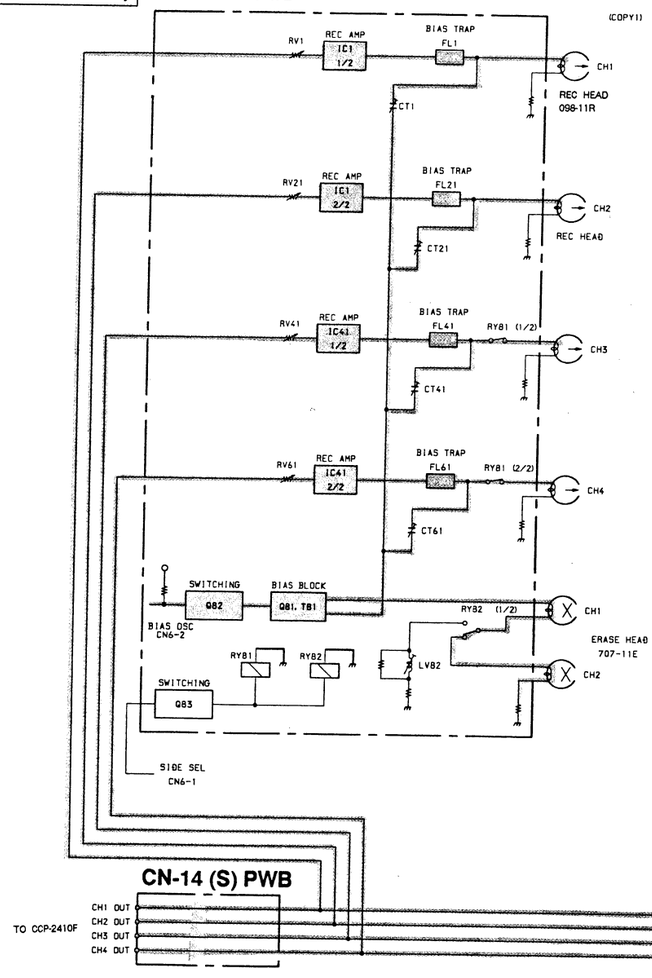


AU-172 PWB

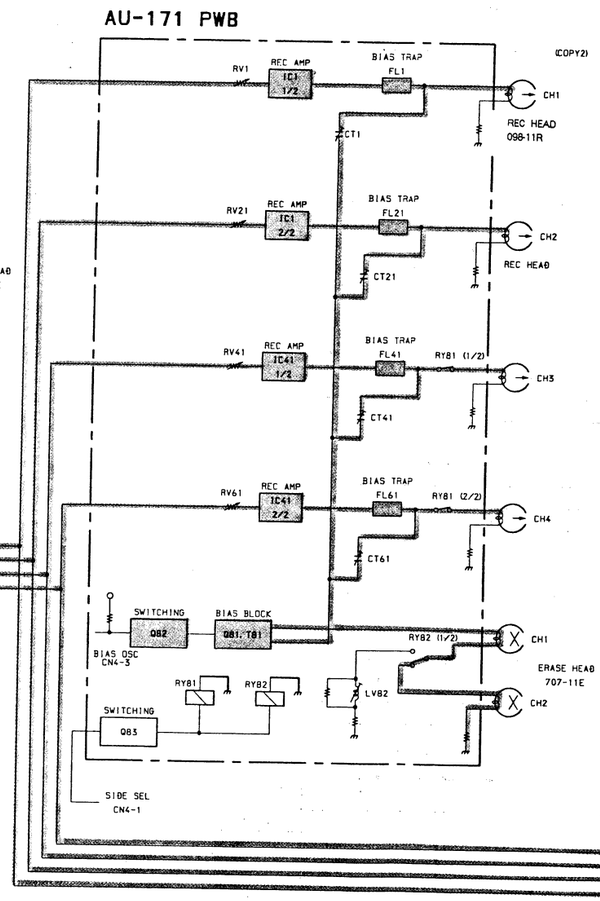


CCP-2410F AUDIO (COPY A+B MODE)

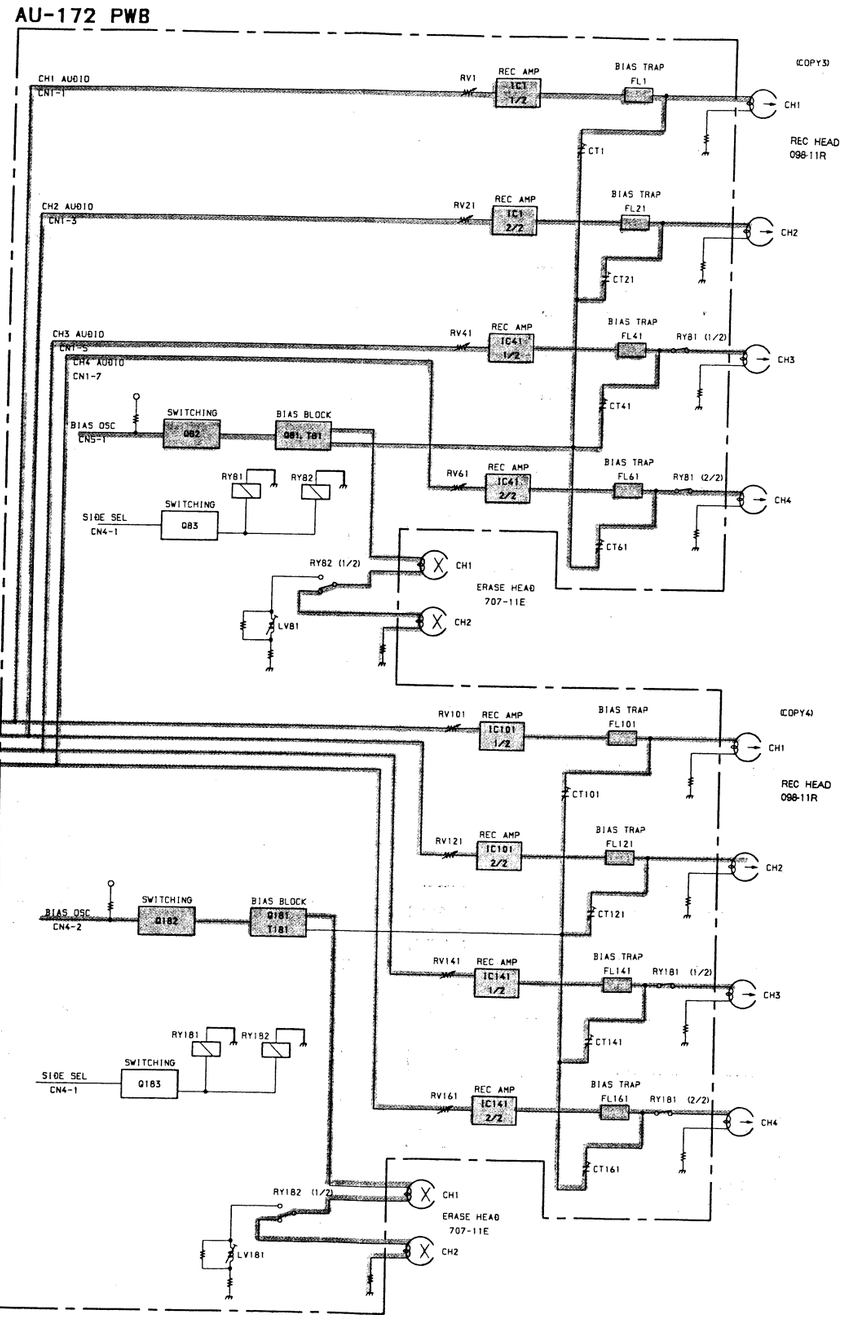
AU-171 PWB



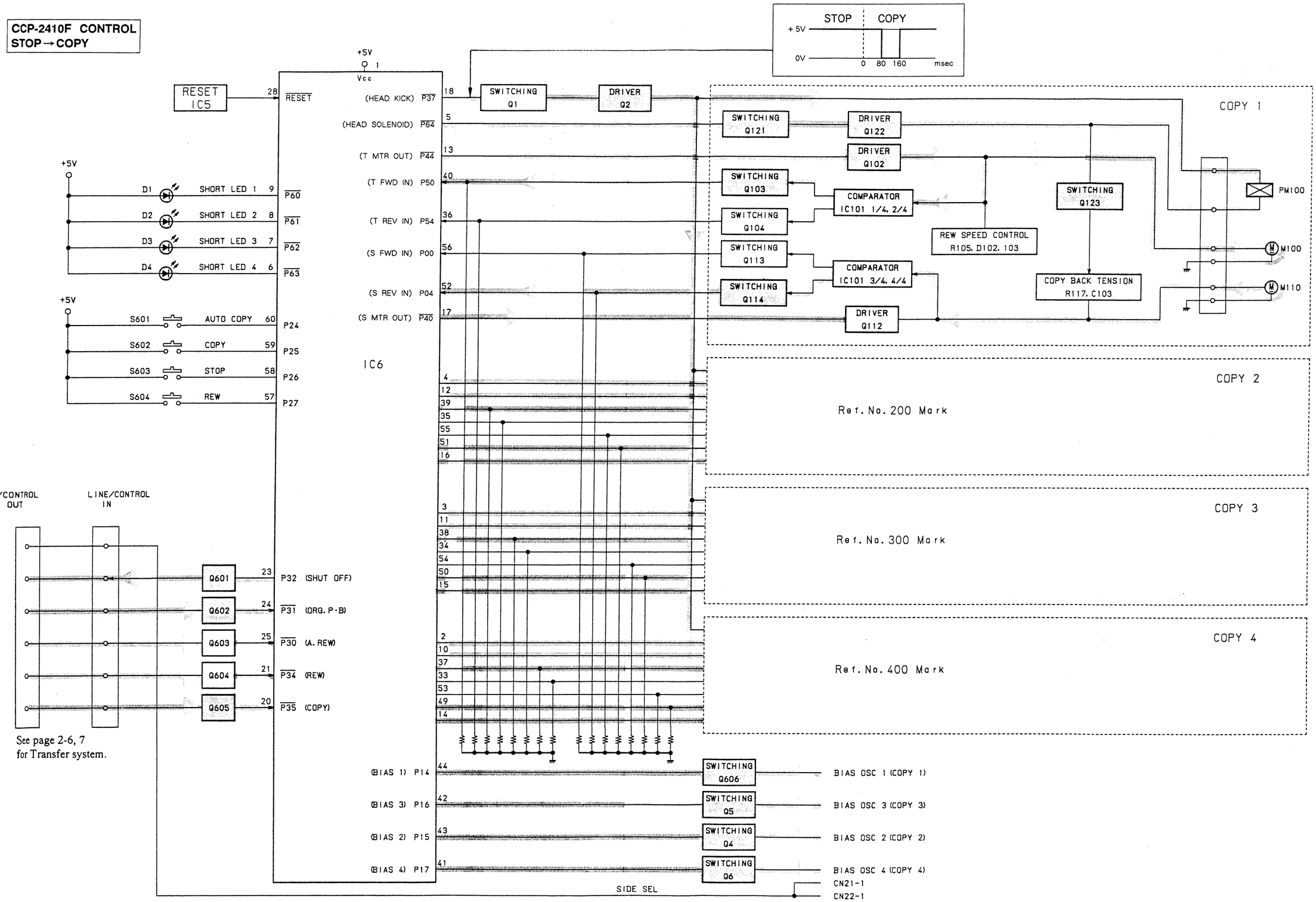
AU-171 PWB



AU-172 PWB

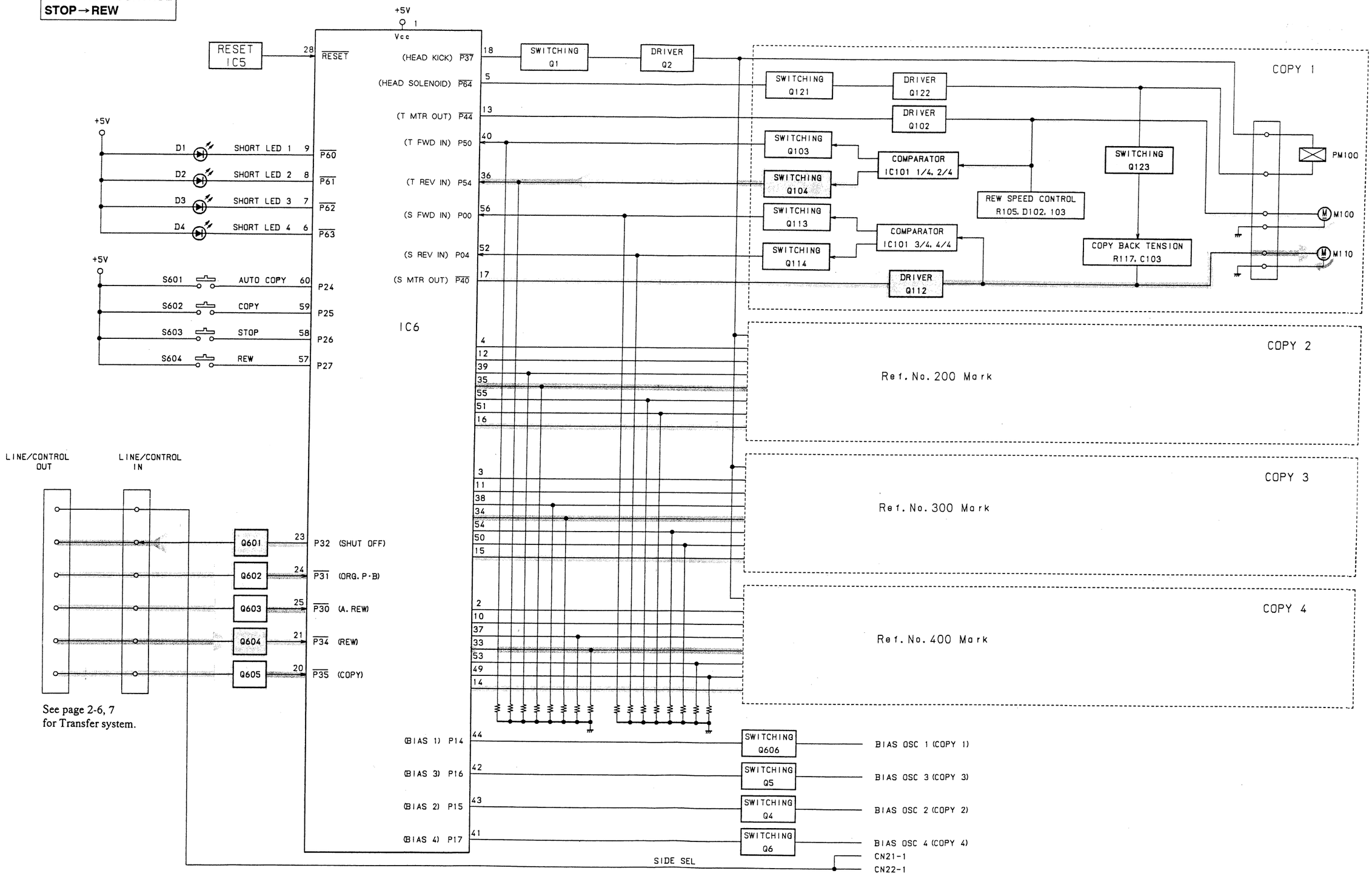


CCP-2410F CONTROL
STOP → COPY



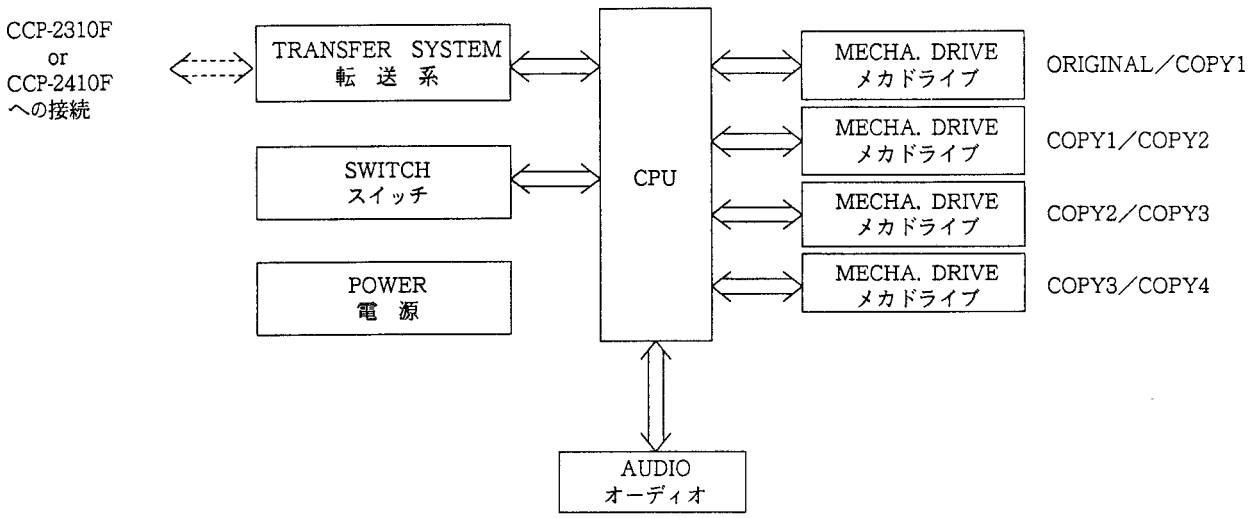
See page 2-6, 7 for Transfer system.

CCP-2410F CONTROL
STOP→REW



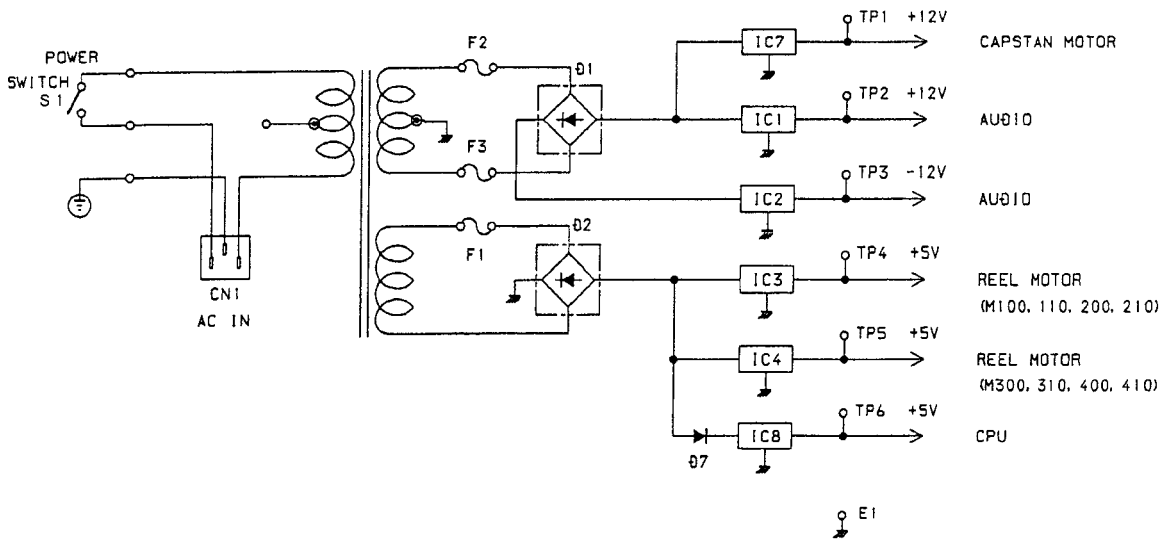
2-2. システムブロック

CCP-2310F／2410Fの回路は下図のような各ブロックより構成されています。



2-3. 電 源

6個の3端子レギュレータを使用し，図のようになっています。



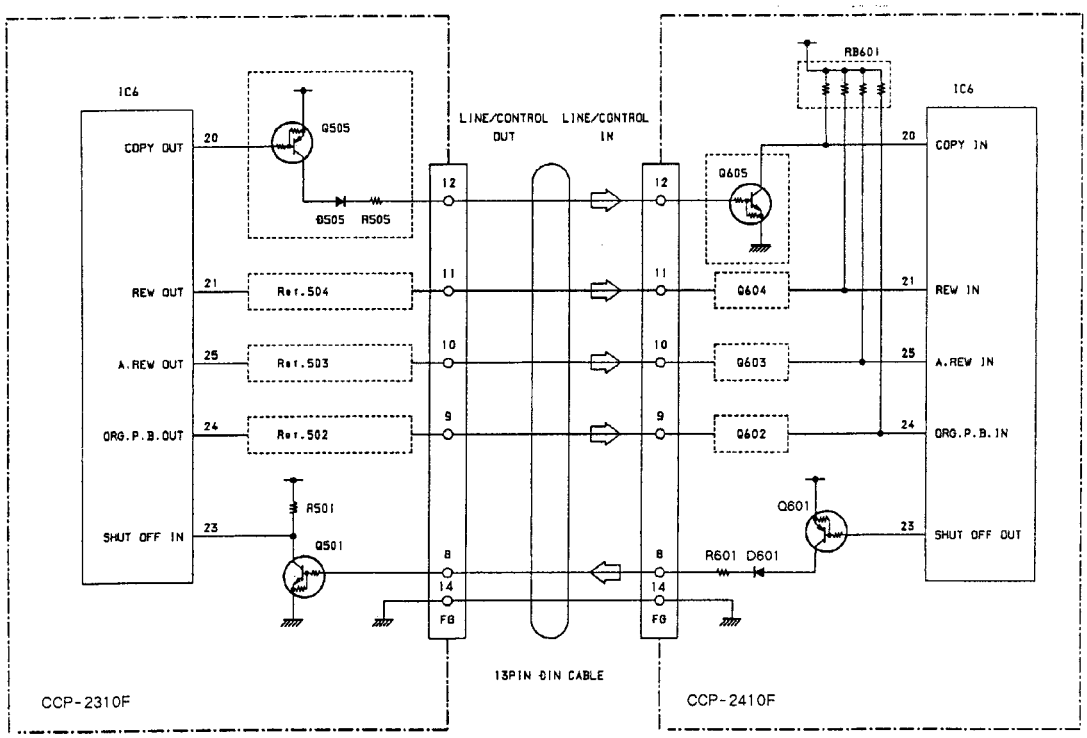
2-4. メカドライブ

各リールモーターはCPUと2本の入力信号（FWD IN, REW IN），1本の出力信号（MTR OUT）で結ばれています。
入力信号ではCPUがモーターの状態（回転中，停止中）を判断します。
出力信号ではCPUがモーターの回転を制御します。
リールモーターのコントロールポートは下表のようになっています。

CPUコントロールポート		IC6（CPU）ピン番号				動　作		
		MD1	MD2	MD3	MD4	STOP	COPY	REW
出　力	T MTR OUT	13	12	11	10	H	L	H
	S MTR OUT	17	16	15	14	H	H	L
入　力	T FWD IN	40	39	38	37	L	H	L
	T REV IN	36	35	34	33	L	L	H
	S FWD IN	56	55	54	53	L	L	H
	S REV IN	52	51	50	49	L	H	L

2-5. 転送系

CCP-2310FとCCP-2410Fのデジタル信号系は3本の動作信号ラインと2本の状態信号ラインで構成されております。
CCP-2410Fを複数接続した場合はCCP-2310F側からみて並列に接続されている型になります。



動作信号

13ピンコネクタ	STOP	COPY	REW	*A.REW
12	L	H	L	L
11	L	L	H	L
10	L	L	L	H

L：CCP-2410Fが接続されなければ
"L" は "OPEN" となります。
＊ A. REW：SHORT TAPE INDICATORの点灯していないテープだけリワインドするモード
AUTO COPYの時，REW→COPY→A. REWと出力されます。

Status信号（CCP-2310F→CCP-2410F）

13ピンコネクタ	CCP-2410Fのメカが一台でも動いている時	その他
9	H	L

Status信号（CCP-2410F→CCP-2310F）

13ピンコネクタ	CCP-2410Fのメカが全て止まっている時	CCP-2410F停止時の全MD
8	H	L

2-6. スイッチ

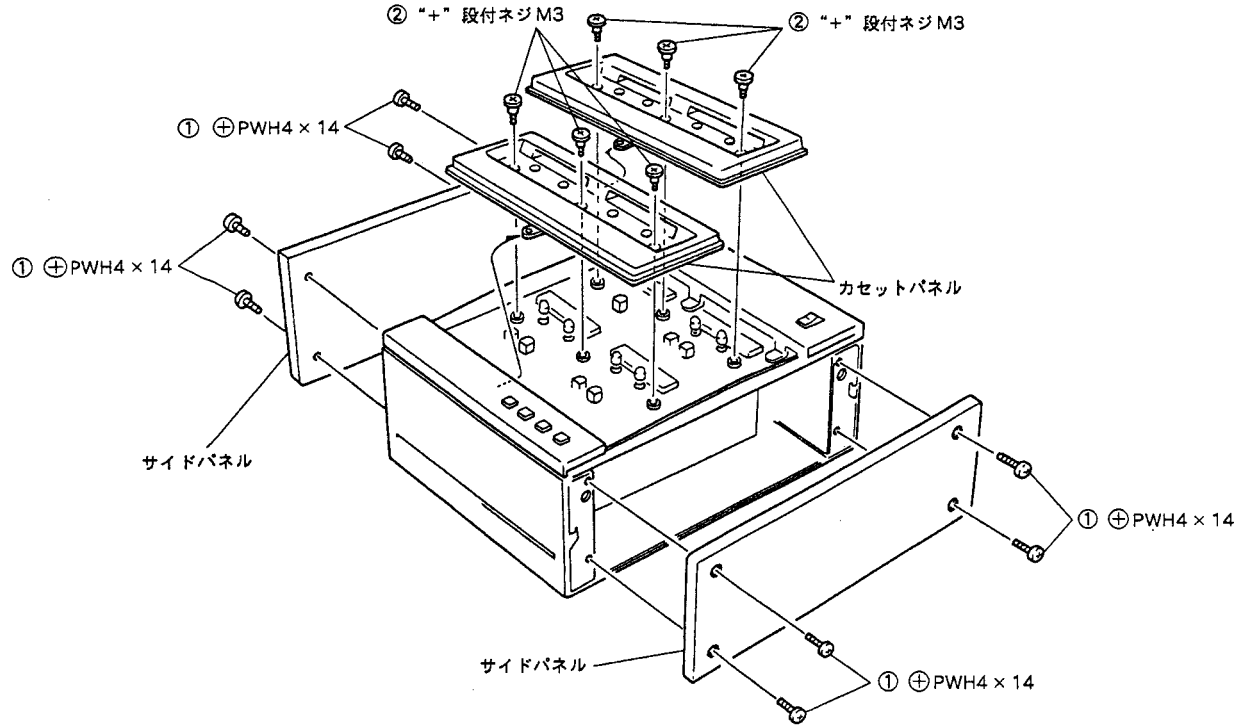
CCP-2310F，2410Fとも，4個のスイッチ（A.COPY，COPY，STOP，REW）を持っています。（CCP-2410Fはセット内部シスコン基板右側，S601－604）SIDE SELECTスイッチはCPU入力されず直接オーディオ基板のリレーを操作しています。
本機には，サービス用特殊機能（クリーニングモード，サービスモード）が2モード有りこのスイッチの操作により動作させることができます。

第3章
サービスインフォメーション

3-1. 外装の外し方

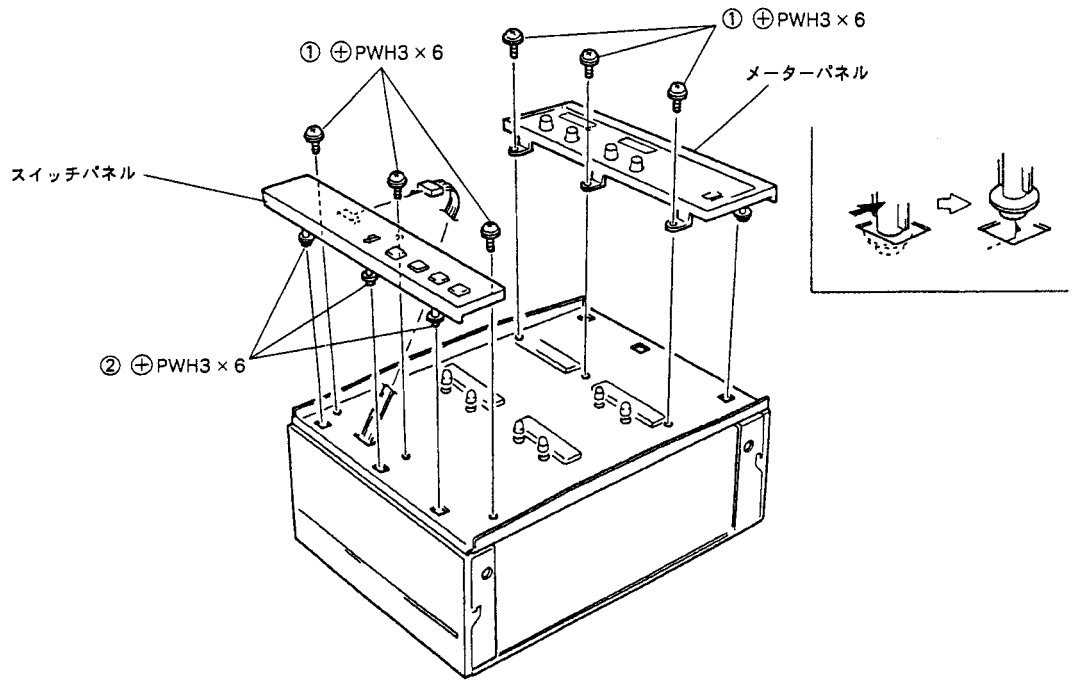
[サイドパネル]
① ネジ（各4本）を外す。

[カセットパネル]
② ネジ（各3本）を外す。各パネルは引っ掛け用の突起があるので注意すること。



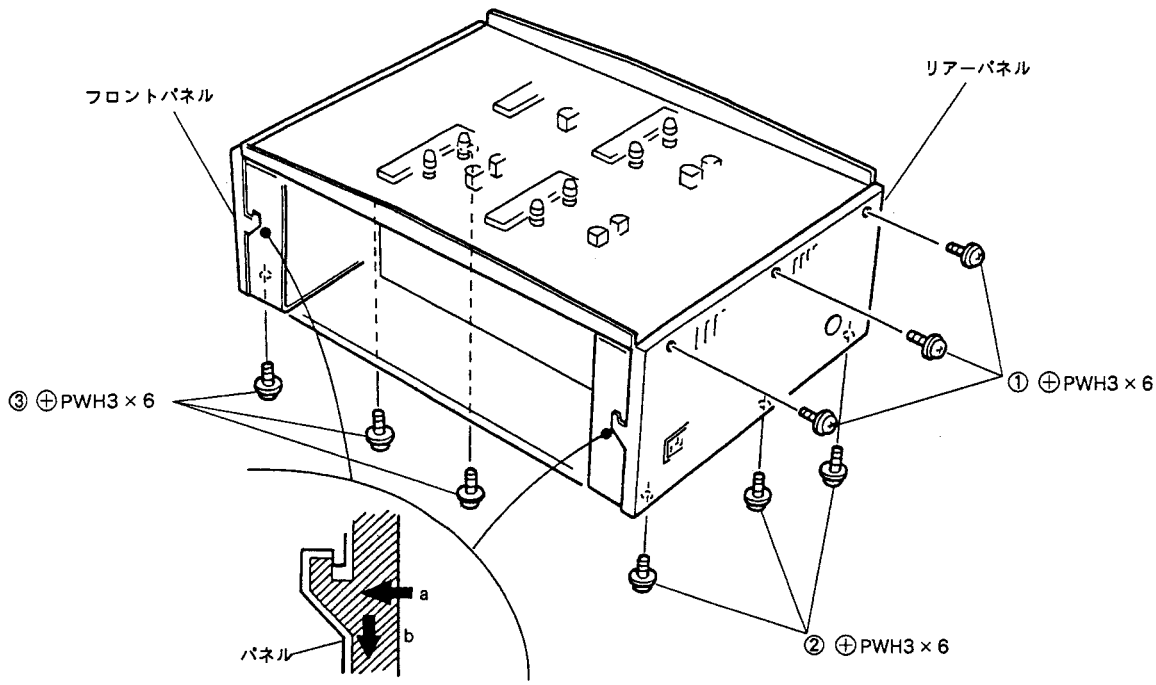
[メーターパネル] [スイッチパネル]
① ネジ（各3本）を外す。

② シャーシーの引っ掛かり（各3ケ所）を外す。



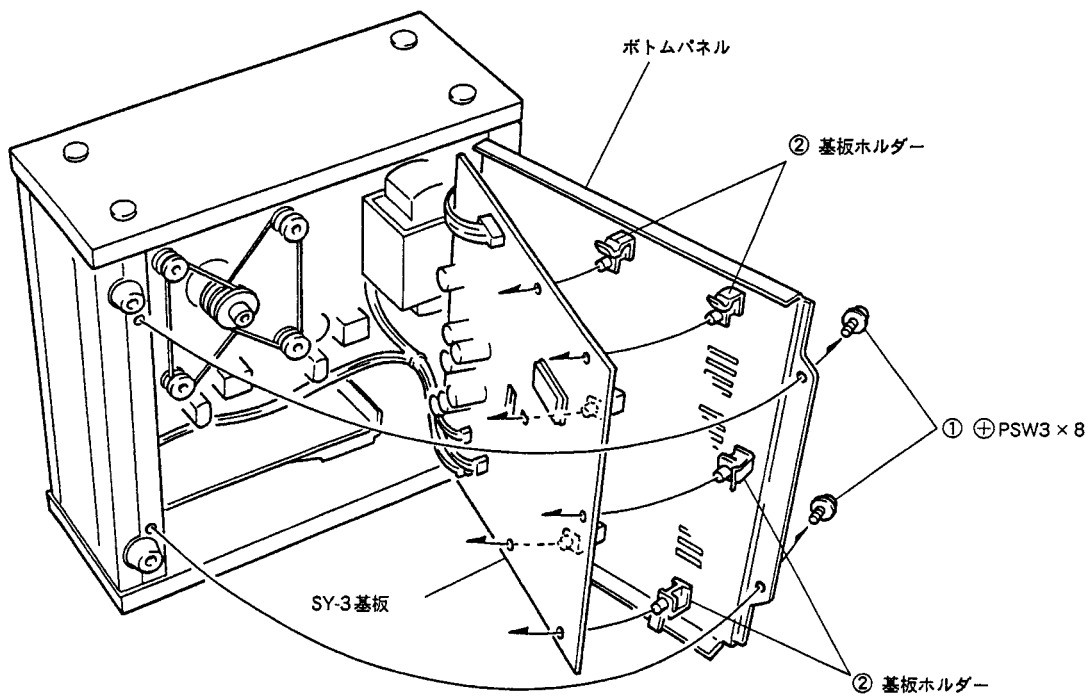
[リアーパネル]
①, ② ネジ（計6本）を外す。
パネルをⓐの方向に押しながらⓑの方向にずらして引っ掛かりを外す。

[フロントパネル]
③ ネジ（計3本）を外す。
パネルをⓐの方向に押しながらⓑの方向にずらして引っ掛かりを外す。



[ボトムパネル]
① ネジ2本を外すと底板と一緒にシスコン基板が開く。

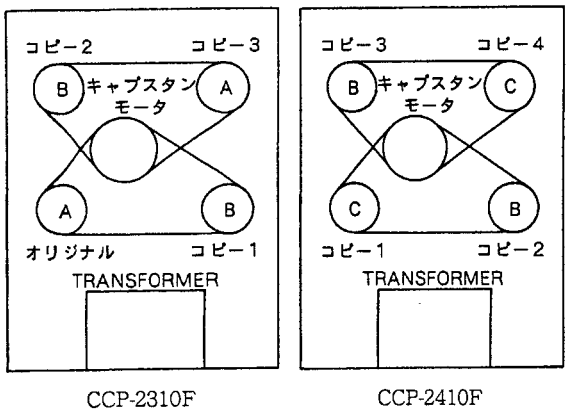
[SY-3 基板]
② 基板ホルダーを外す（6ケ所）と基板が開く。



3-2. キャプスタンAssyについて

本機は4組のキャプスタンAssyを2本のキャプスタンベルトを使い1個のキャプスタンモータで駆動しています。
下記に示す概略図は底板をはずし，シャーシ裏側からみたキャプスタンAssyとキャプスタンモータの配置図です。

(BOTTOM VIEW)



CCP-2310F　　CCP-2410F

図 1

3-2-1. オリジナルMDとコピーMDのスピード差

CCP-2310F／2410Fではコピーテープがオリジナルテープよりも早く巻取ることによって生じる未録音部防止のためコピーMDのスピードをオリジナルMDより1%遅くしています。このスピード差はフライホイールの径の大小によって行なっています。

3-2-2. キャプスタンAssyの種類と配置

キャプスタンAssyの種類と組合せは図-1および下表のようにCCP-2310F／2410F全体で3種類となっています。

MD CCP-2310F／CCP-2410F	CCP-2310F	CCP-2410F
ORIGINAL／COPY1	A-2109-010-A キャプスタン(A)Assy	A-2109-011-A キャプスタン(C)Assy
COPY1／COPY2	A-2109-009-A キャプスタン(B)Assy	A-2109-009-A キャプスタン(B)Assy
COPY2／COPY3	A-2109-009-A キャプスタン(B)Assy	A-2109-009-A キャプスタン(B)Assy
COPY3／COPY4	A-2109-010-A キャプスタン(A)Assy	A-2109-011-A キャプスタン(C)Assy

表1

3-2-3. キャプスタンAssyの見分け方と寸法

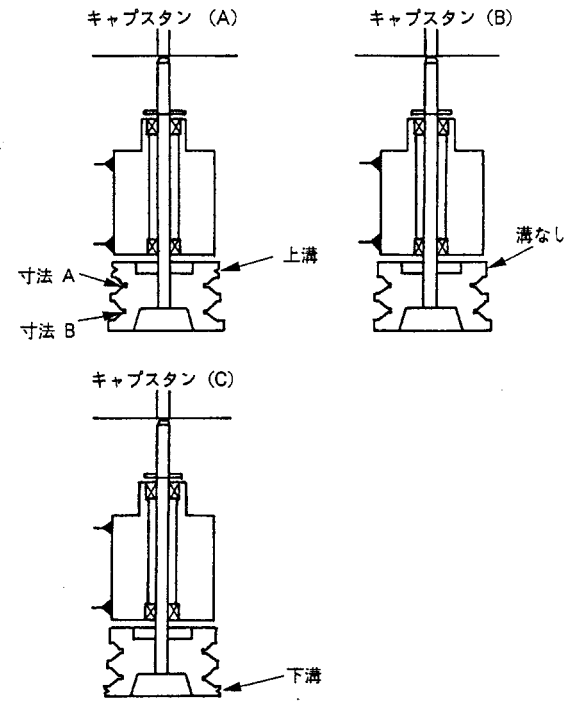


図 2

キャプスタンAssyの見分け方は

1. キャプスタン（A）Assy　フライホイール上部に溝付
2. キャプスタン（B）Assy　無印
3. キャプスタン（C）Assy　フライホイール下部に溝付

フライホイール内径寸法は

	キャプスタン(A) Assy	キャプスタン(B) Assy	キャプスタン(C) Assy
寸法A	19.87	20.0	20.07
寸法B	20.07	20.0	20.07

注）キャプスタンAssy交換時の時は同じAssy No.のものと交換して下さい。又，ベルトの掛け位置も同じ位置にしませんとスピードコントロールが出来なくなります。

3-2-4. オリジナルとコピーのスピード差をなくす場合

CCD-2310F／2410Fではオリジナル MD とコピー MD 間に1%のスピード差があるため，スピード差のないテープを作る場合にはCCP-2310Fの改造が必要です。

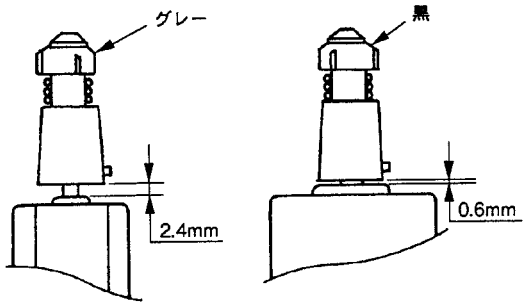
改造の方法は

CCP-2310Fのオリジナル MD に使用しているキャプスタン（A）Assyをキャプスタン（C）Assyに代えることによって可能です。

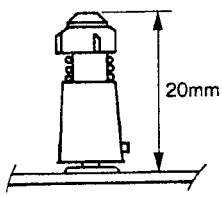
3-3. リール台Assyの取り付け位置

リール台の交換には2通りの方法があります。

1) モータ単体に取り付ける場合（モータ交換時など）
モータ単体とリール台の取り付け関係は下図のA, Bとします。



A：リール台（左）Assy　　B：リール台（右）Assy



C：シャーシーからの高さ

図3

2) シャーシからの位置出し（モータがシャーシについている場合）
図3Cのようにシャーシからリール台の頂点までは20mmです。

注) 1. 交換時はモータとリール台Assyが接触していないことを確認して下さい。
2. リール台Assyの取り付けネジ（六角穴付押ネジ2×3）は六角レンチにて強固に締付けて下さい。
3. 左側のモータのシャフトは一部スリ落し部分がありますので2本の取付けネジのうち1本はこのスリ落し部にとめて下さい。

3-4. キャプスタンモーターとモータープーリーの組立

キャプスタンモーターシャフトにモータープーリーをゆっくりと挿入していき止まったところで六角穴付ネジを締付けます。

組み付け関係は図4の通りです。

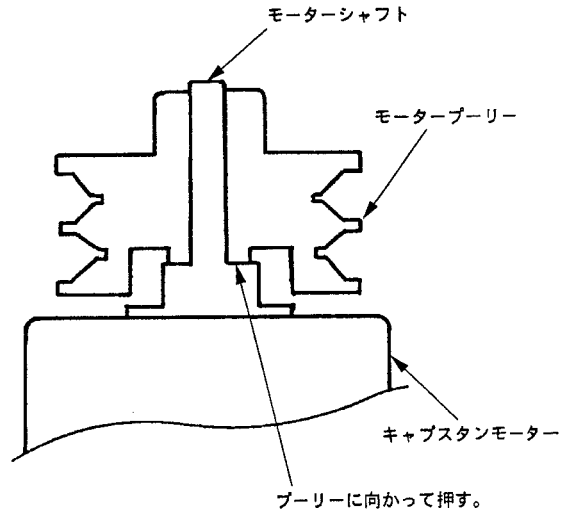
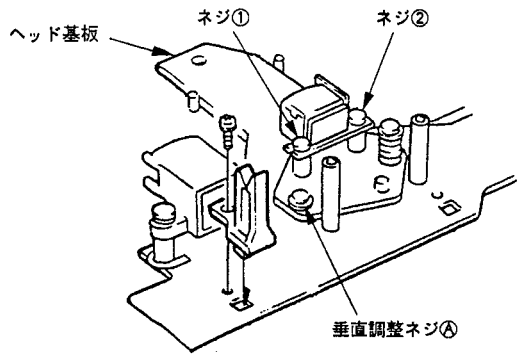


図4

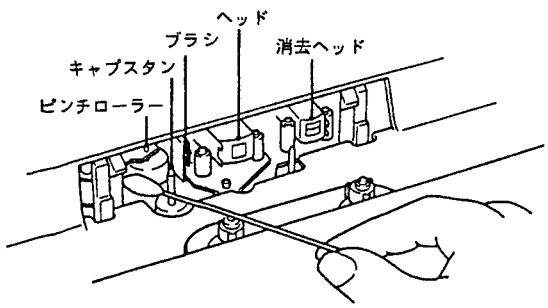
3-5. ヘッドの交換方法

1. ヘッドのリード線の半田を外す。
2. ヘッドを固定しているネジを外す。(ネジ①はユルメルのみ)
3. 新しいヘッドをネジ①, ②で取りつける。
4. 取りつけ後, ヘッドの高さ, 垂直の調整を行う。



3-6. クリーニングモード

本機にはメインテナンスを容易に行えるようにクリーニングモードとサービスモードが用意されています。
以下の操作方法に従って動作させてください。

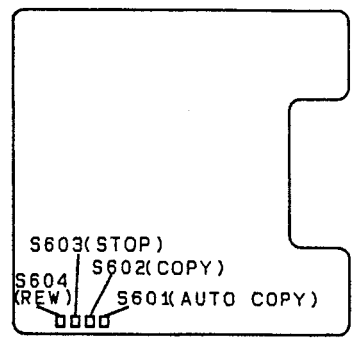


ヘッド, ピンチローラー等を簡単にクリーニングできるようにヘッドブロックが出てきます。
操作方法
CCP-2310F
カセットを取り出し, COPY釦を押しながらPOWERスイッチを入れると, 約4秒後ヘッドブロックが出てきます。ヘッドブロックは5分後自動的に戻りますが, クリーニングモードはCOPY釦以外の釦を押さないと解除できません。

CCP-2410F
CCP-2310Fがクリーニングモードの時, CCP-2310Fに接続してPOWERスイッチを入れるとクリーニングモードになります。
CCP-2410F単独で動作させる場合は, セット内部のCOPYボタン (S602) を押しながらPOWERスイッチを入れると, 約4秒後にクリーニングモードになります。(この際音声信号／コントロール信号接続ケーブルを絶対に接続しないこと。)
その後, COPY以外の釦を押してクリーニングモードを解除するとCCP-2410FをS601 – 604のスイッチでCCP-2310Fと同様の操作ができます。

但し, CCP-2410Fは転送系に出力は出ません。
通常の動作 (CCP-2310Fと接続) させるには, 一度POWERスイッチを切ってから行ってください。

SY-3 基板部品面



3-7. サービスモード

リールモーターの回転やヘッドアジマス調整が簡単にできるように考えられたモードです。
操作方法
CCP-2310F, CCP-2410F共に同じ方法で行うことができます。

1) REWとAUTO COPY釦を押しながらPOWERスイッチを入れます。
2) 釦を押し続け, 約4秒後にSHORT TAPE INDICATORが消えた後, AUTO COPY釦を外します。(この際REW釦を外さないこと)
3) さらに2秒後, 再びINDICATORが点灯しサービスモードに入った事を確認してからREW釦を外してください。

以下の操作ができます。

AUTO COPY : COPY状態と同じになりますが, バイアスは立ち上がりません。よって録音ヘッドから直接再生アンプに入れるとアジマスを容易にとれます。

COPY : COPY状態のままになりますので, TAKE UPリール, プランジャー回路のチェックができます。

REW : REWIND状態のままになりますのでSUPPLYリール回路のチェックができます。

注) COPY, REWの場合, シャットオフ, ブレーキ回路が働きませんので, テープは絶対に入れないでください。カセットを入れると, テープエンドでリールモーター等に支障を与えます。

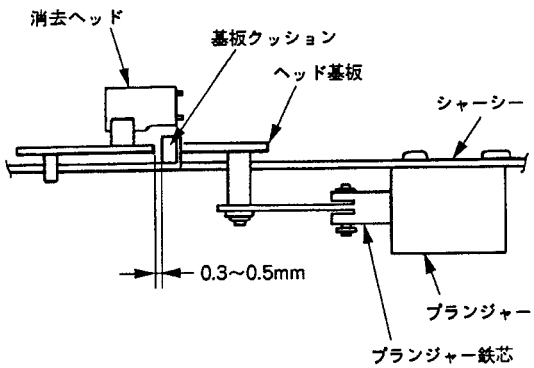
[Test tape]

テープ	部品番号	信号	
		周波数 (Hz)	レベル (dB)
P-4-L300	7-819-011-11	315	0
P-4-A063	7-819-014-11	6.3 k	– 10
P-4-A100	7-819-016-11	10 k	– 10
WS-48A	7-819-032-11	3 k	0
CQ-012C	8-909-708-02	Mirror, 12 μ base	
CQ-201B	8-909-708-41	Torque	

第4章
調　整

4-1. プランジャーストローク調整

プランジャーを交換した場合，ヘッドの突込量を定めるため，プランジャーストロークの調整が必要です。



交換と調整手順

1. シャーシー表面側にあるカセット受けをはずすとプランジャー取付用のネジ（PSW3×6）があります。

2. プランジャーを交換しシャーシーに仮止めし，ヘッド基板と接続します。
3. プランジャーの鉄芯を押し込み，プランジャー本体と密着させるとヘッド基板が前進します。

4. プランジャーの固定位置はシャーシー表面の切り起し部に接着してある基板クッションとヘッド基板のスキ間が0.3~0.5mmの位置です。

注）交換後Copy状態（サービスモードorクリーニングモード）でスキ間が0.3~0.5mm確保されていることを確認して下さい。

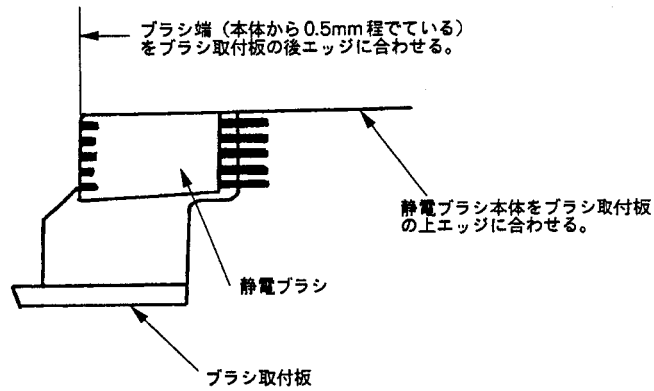
4-2. 静電ブラシの交換

静電気の放電抑制用に静電ブラシがヘッド基板上についています。
ヘッド基板が前進することによりテープと接触しますので摩耗します。
交換方法は下記の通りです。

1）ヘッド基板上にある静電ブラシAssyをはずし（PS2×4）ブラシ取付板から静電ブラシをはがします。

2）ブラシ取付板をアルコールなどで拭き，新しい静電ブラシを接着します。
3）取り付け位置は次図の通りです。

注）ブラシ部は細いステンレス線です。交換の際に曲げてしまわないように注意して下さい。

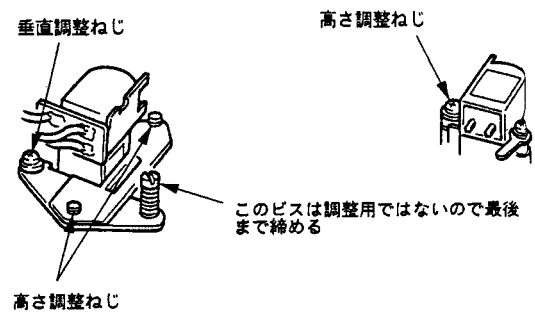


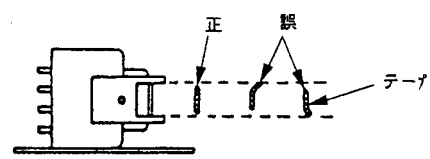
4-3. ヘッドの高さ調整

1. ミラーテープ（CQ-012C）を装着し，COPY↔STOPをくり返して，テープがテープガイドに正常にホールドされているかどうかを確認する。
2. COPY状態にして，もしテープがテープガイドに当ってカールするようであれば，テープがねじれないように（一直線に見えるように）下記の個所を調整する。

注）ヘッドの垂直，あおりにも注意し，目視にて確認する。このため，前後の高さ調整ねじ，垂直調整ねじとも同程度ずつ回すようにする。

録再ヘッド　：　　ガイドヘッド：





4-4. ヘッドの垂直調整（アジマス調整）

次の3種類の方法よりしやすい方法を選んで行ってください。

＊カセットテープを挿入した状態でサービスモードのCopy, Rewindの各スイッチを押さないこと。
消磁器を使用してヘッドを消磁してヘッドとピンチローラの清掃を行なう。

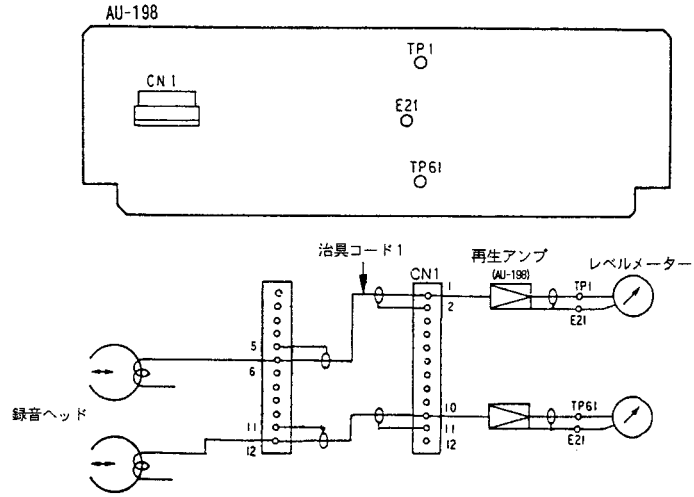
A. 本機の再生AMP（AU-198）を使用する方法。

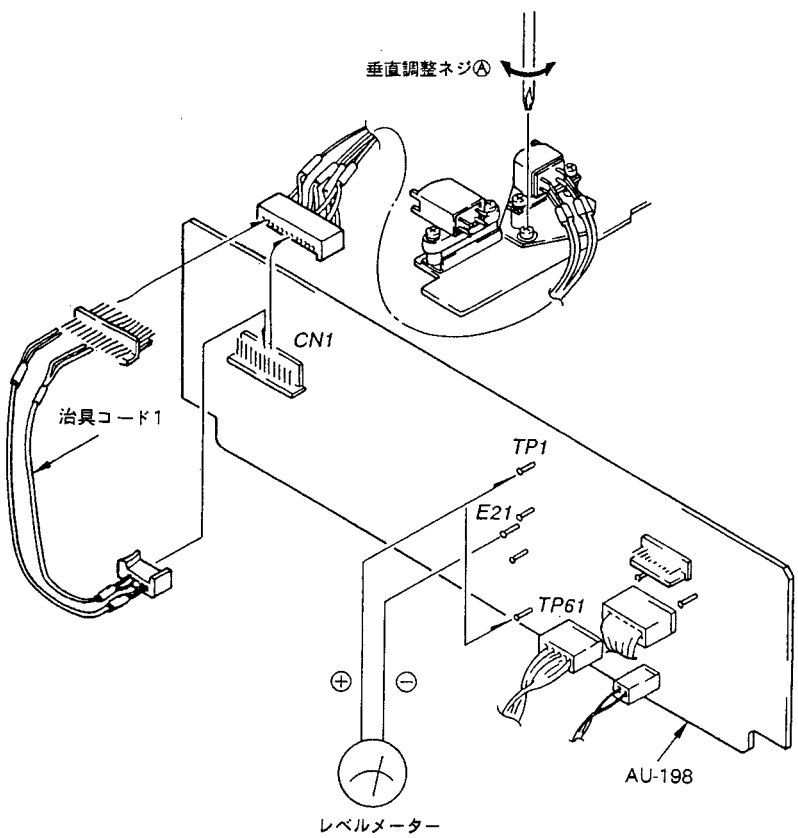
測定器：治具コード1
テストテープ（P-4-A100）
レベルメーター
CCP-2310F

手順）

＊1. AU-198基板のオリジナルヘッドのケーブル（コネクターCN1）を外す。
＊2. 治具コード1の一方を調整するヘッドからのコネクターへ他方をAU-198基板上のCN1に接続する。
3. レベルメーターの＋側をAU-198基板上のTP1, TP61に, －側をE21に接続する。
4. 調整するデッキに標準テープ10kHz（P-4-A100）を入れる。
5. サービスモード（ページ3-5サービスモードの項参照）のAUTO COPY釦を押し再生状態にする。
6. レベルメーターの値（TP1, TP61の出力）が最大になるところに垂直調整ネジⒶを回して合わせる

＊ 再生ヘッドの場合は＊の項目はおこなわなくてよい。



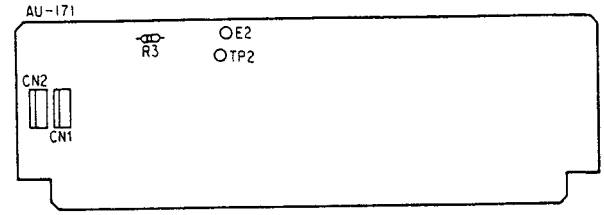


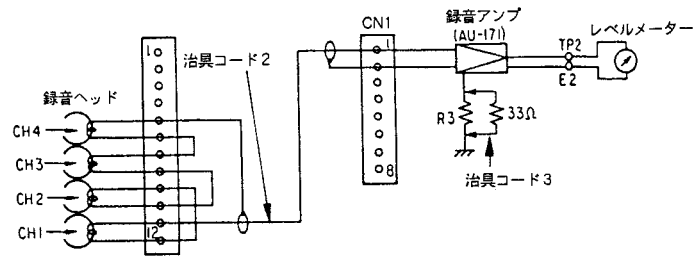
B. CCP-2310Fがない場合

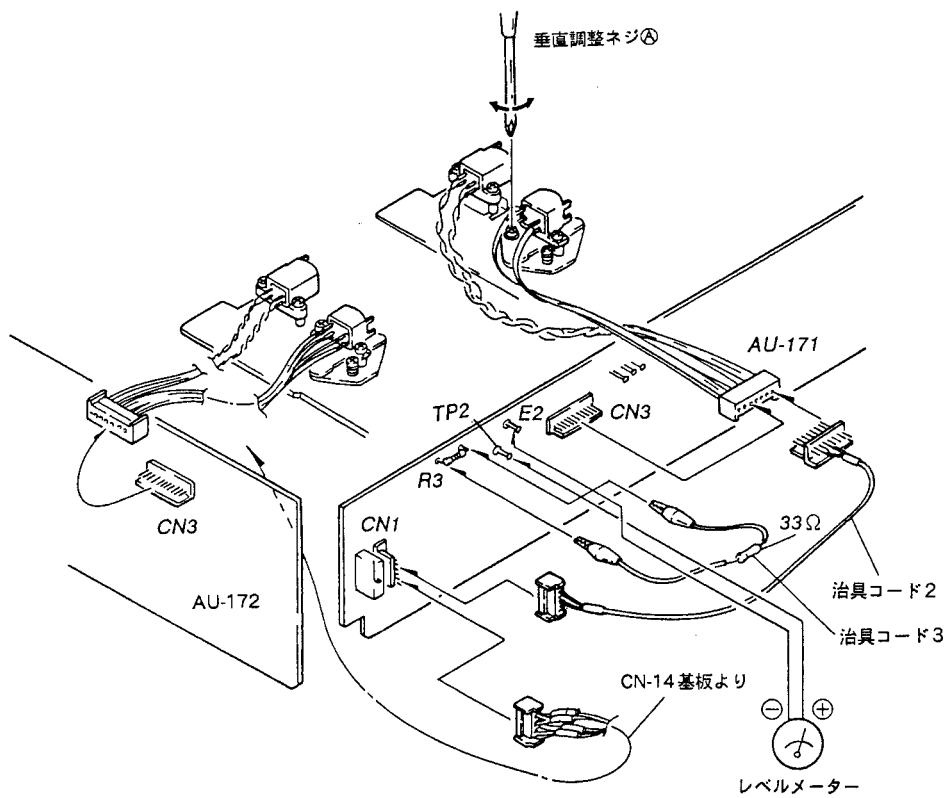
測定器：治具コード2
治具コード3
テストテープ（P-4-A100）
レベルメーター

手順)

1. 各ヘッドのコネクターをAU-171又はAU-172基板より外す。
2. AU-171基板のCN1（CN-14基板よりきているオーディオケーブル）を外す。
3. 治具コード2の一方を調整するヘッドからのコネクターへ，他方をAU-171基板上CN1に接続する。
4. 治具コード3（抵抗33Ω）をAU-171基板のR3に並列に入れる。
5. 調整するデッキに標準テープ10kHz(P-4-A100)を入れる。
6. レベルメーターの＋側をAU-171基板上TP2に，－側をE2に接続する。
7. サービスモード（ページ3-5サービスモードの項参照）のAUTO COPY釦を押し再生状態にする。
8. レベルメーターの値が最大になるところに垂直調整ネジⒶを回して合せる。







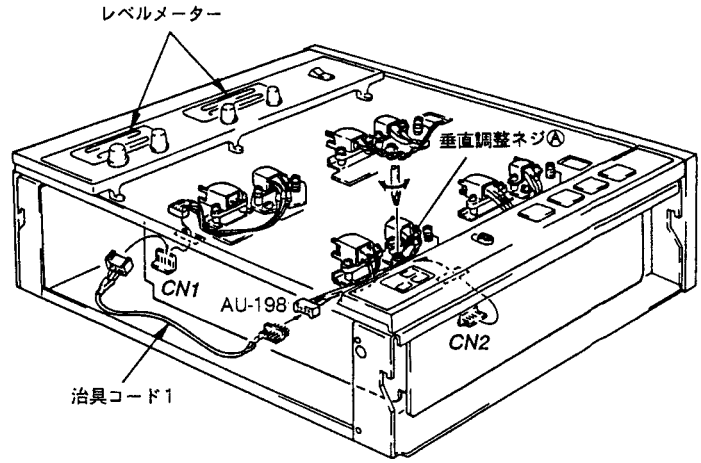
C. 本機のレベルメーターを使用する方法

測定器：治具コード1
テストテープ（P-4-A100）
CCP-2310F（CCP-2410Fの録音ヘッド調整用）

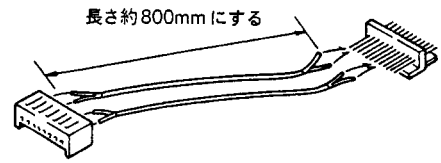
手順）

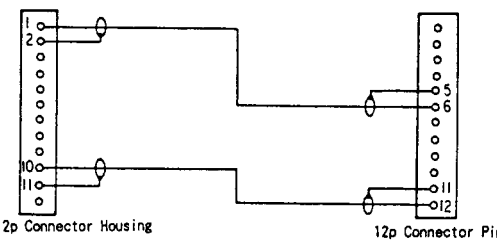
1. メーター基板のS41をCHECK側に切り換える。
*2. AU-198基板のコネクターCN1（オリジナルヘッドよりきているケーブル）を外す。
*3. 治具コード1の一方を調整するヘッドからのコネクターへ，他方をAU-198基板上CN1に接続する。
4. 調整するデッキに標準テープ10kHz(P-4-A100)を入れる。
5. サービスモード（ページ3-5サービスモードの項参照）のAUTO COPY釦を押し再生状態にする。
6. B面で，左レベルメーターの値が最大になるところに垂直調整ネジⒶを回して合せる。
（レベルメーターの0dB近くで微細に調整できますので10kHzの再生レベルが0dB近くになるように音量調整ボリュームで調整しながら垂直調整ネジⒶを回してください。）
7. 調整後，メーター基板上のS41をCHECK側からNORMAL側に戻してください。S41をCHECK側にすることにより，録再ヘッドからの小信号をメーターに表示できるように約20dBアップさせています。

＊ 再生ヘッドの場合は＊の項目はおこなわなくてよい。

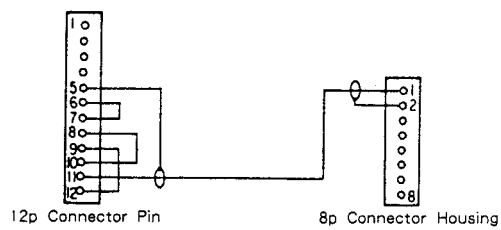


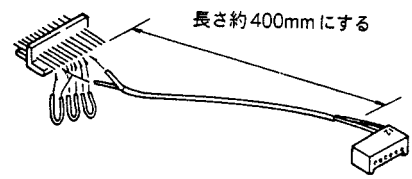
治具コード1の作成方法



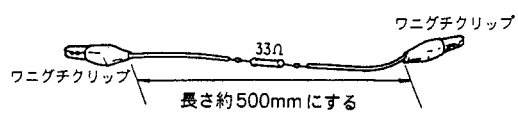


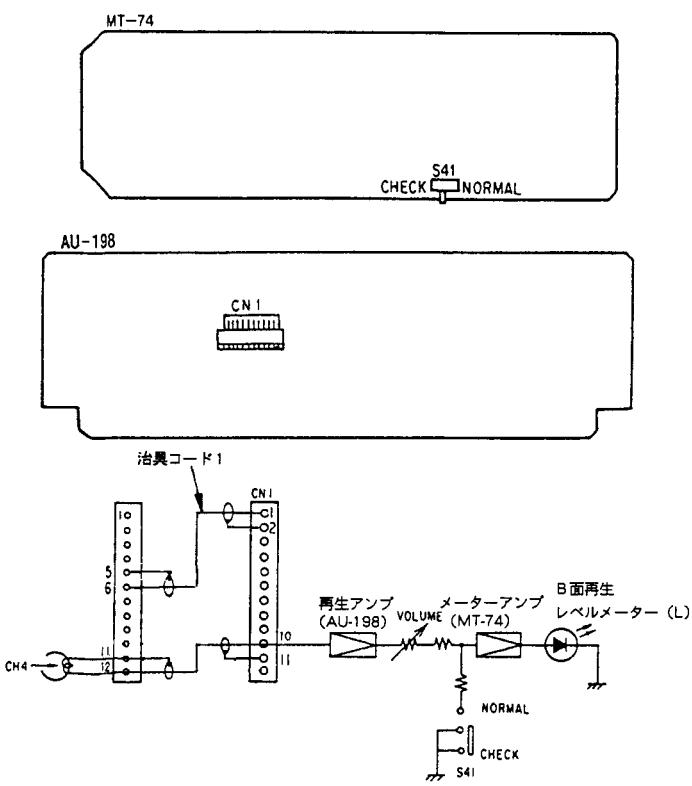
治具コード2の作成方法





治具コード3の作成方法





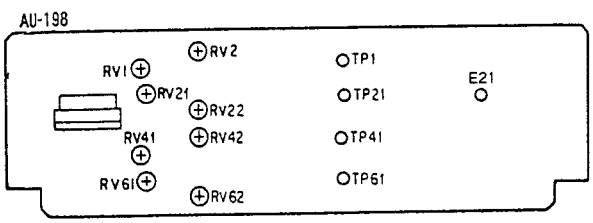
4-5. 再生出力レベル調整（CCP-2310F のみ）

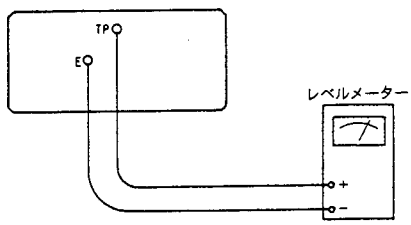
測定器：消磁器
　　レベルメーター
　　テストテープ（P-4-L300）

手順）

1. 消磁器にてヘッドの消磁，及びピンチローラー及びヘッドの清掃を行う。
2. 再生レベルのコントロールのツマミA，B（MT-74基板上のRV1，RV21，RV41，RV61）をセンターにセットする。
3. POWERスイッチをONにする。
4. SIDEセレクターを「A＋B」にセットする。
5. オリジナルに標準テープ（P-4-L300）を入れる。
6. COPY釦を押し，AU-198基板上の各TPにレベルメーター端子を接続する。
   各TPの出力が0±0.5dBになるように各々のRVを調整する。
   規格 0±0.5dB

基板	CH	レベルメーター接続		調整
		＋端子	－端子	
AU-198	CH1	TP1	E21	RV1
	CH2	TP21	E21	RV21
	CH3	TP41	E21	RV41
	CH4	TP61	E21	RV61





4-6. 周波数特性の調整（CCP-2310F のみ）

測定器：レベルメーター
　　テストテープ　P-4-L300
　　P-4-A063
　　P-4-A100

注意：この調整に入る前に必ず再生レベルの調整が終わっている事。

手順）

(315Hz)

1. テストテープ（P-4-L300）をオリジナル側に入れる。
   COPY釦を押し再生出力レベルを測定する。

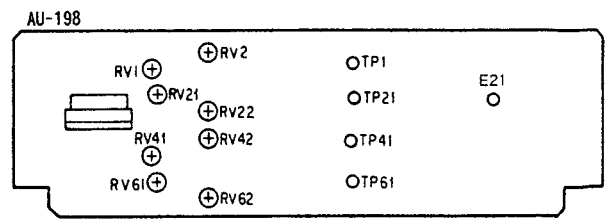
(6.3kHz)

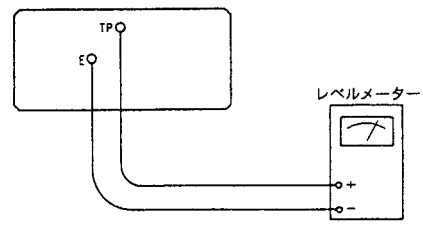
2. テストテープ（P-4-A063）をオリジナル側に入れる。
   COPY釦を押し再生出力レベルを測定する。

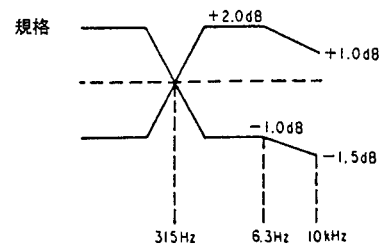
(10kHz)

3. テストテープ（P-4-A100）をオリジナル側に入れる。
   COPY釦を押し再生出力レベルを測定する。
4. 再生出力レベルが規格に入っていなかった場合，各々のテストポイントに対応したAU-198基板上のRVを調整する。

基板	CH	レベルメーター接続		調整	
		＋端子	－端子	6.3kHz	10kHz
AU-198	CH1	TP1	E21	RV2	RV1
	CH2	TP21	E21	RV22	RV21
	CH3	TP41	E21	RV42	RV41
	CH4	TP61	E21	RV62	RV61







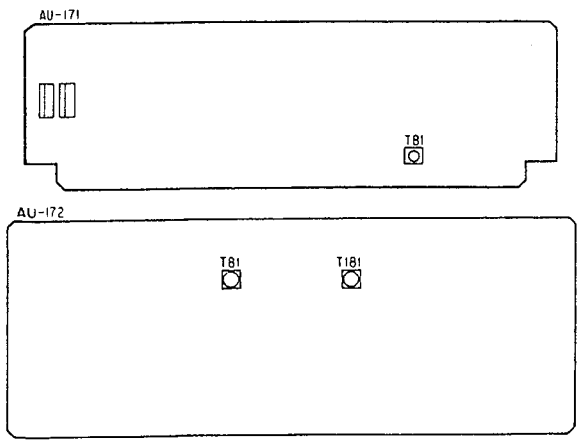
4-7. バイアス周波数調整（CCP-2310F, 2410F）

測定器　：レベルメーター
　　周波数カウンター
　　コイル 10mH
調整箇所　：AU-171基板　　T81
　　AU-172基板　　T81, T181

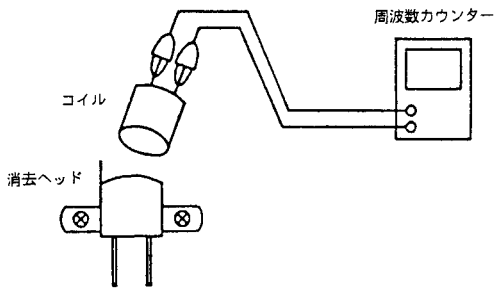
手順）

1. 周波数カウンターにコイルを接続する。
2. CCP-2310FのSIDEセレクターを「A＋B」にセットする。CCP-2410Fの調整の場合はSIDEセレクターの設定が最初から「A＋B」になっています。
3. サービスモード状態にする。但し，CCP-2410Fの調整の場合はセット内部SY-3基板上スイッチ操作でサービスモード状態にする。
（注意：カセットテープを入れないこと，P3-5参照。）
4. COPY釦を押し，30秒後コイルを消去ヘッドに近づけて，バイアス周波数が下記値になるよう，次のバイアストランスを調整する。

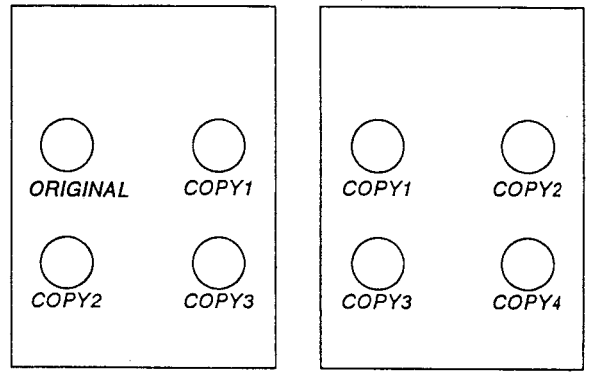
機種名	基　板	バイアストランス	コピー
CCP-2310F	AU-171	T81	COPY 1
	AU-172	T81	COPY 2
		T181	COPY 3
CCP-2410F	AU-171 (LEFT)	T81	COPY 1
	AU-171 (RIGHT)	T81	COPY 2
	AU-172	T81	COPY 3
		T181	COPY 4



規格：550 ± 6kHz



CCP-2310F　（TOP　VIEW）CCP-2410F



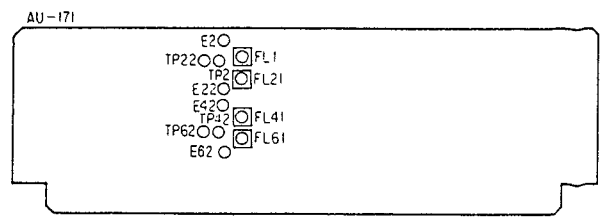
4-8. バイアストラップ調整（CCP-2310F, 2410F）

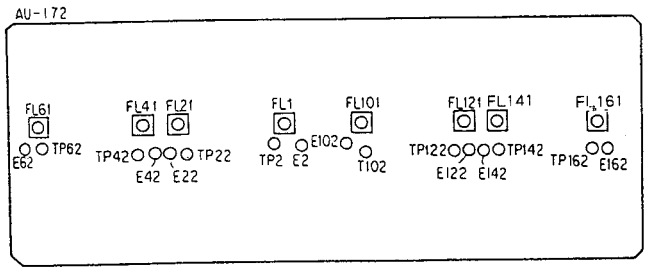
測定器　：レベルメーター

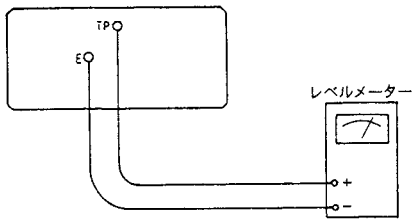
手順）

1. CCP-2310FのSIDEのセレクターを「A＋B」にセットする。CCP-2410Fの調整の場合は，SIDEセレクターの設定が最初から「A＋B」になっています。
2. サービスモード状態にする。但し，CCP-2410Fの調整の場合はセット内部SY-3基板上スイッチの操作でサービスモード状態にする。
（注意：カセットテープを入れないこと，P3-5参照。）
3. COPY釦を押し，AU-171，AU-172基板の下記テストポイントにレベルメーターを接続して，出力が最小になるように各々のテストポイントに対応するバイアストラップを調整する。

基　板	CCP-2310F	CCP-2410F	CH	レベルメーター接続		調　整
				＋端子	－端子	
AU-171	COPY 1	COPY 1 2	CH1	TP2	E2	FL1
			CH2	TP22	E22	FL21
			CH3	TP42	E42	FL41
			CH4	TP62	E62	FL61
AU-172	COPY 2	COPY 3	CH1	TP2	E2	FL1
			CH2	TP22	E22	FL21
			CH3	TP42	E42	FL41
			CH4	TP62	E62	FL61
	COPY 3	COPY 4	CH1	TP102	E102	FL101
			CH2	TP122	E122	FL121
			CH3	TP142	E142	FL141
			CH4	TP162	E162	FL161







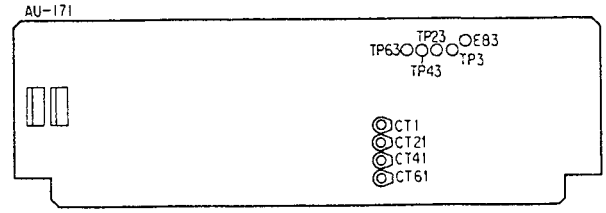
4-9. バイアス電流仮調整（CCP-2310F, 2410F）

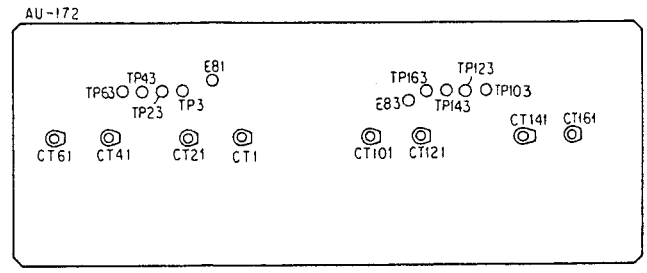
測定器　：電圧計

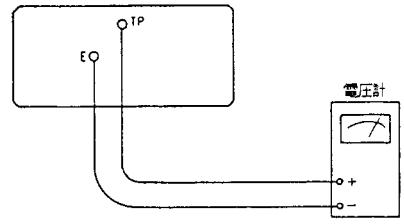
手順）

1. サービスモード状態にする。但し，CCP-2410Fの調整の場合はセット内部SY-3基板上のスイッチの操作でサービスモード状態にする。
   （注意：カセットテープを入れないこと。P3-5参照）
2. COPY釦を押し，AU-171，AU-172基板の下記テストポイントに電圧計を接続して，出力が20 ± 3mVになるように各々のテストポイントに対応するトリマーコンデンサを調整する。

基　板	CCP-2310F	CCP-2410F	CH	レベルメーター接続		調　整
				＋端子	－端子	
AU-171	COPY 1	COPY 1, 2	CH1	TP3	E83	CT1
			CH2	TP23	E83	CT21
			CH3	TP43	E83	CT41
			CH4	TP63	E83	CT61
AU-172	COPY 2	COPY 3	CH1	TP3	E81	CT1
			CH2	TP23	E81	CT21
			CH3	TP43	E81	CT41
			CH4	TP63	E81	CT61
	COPY 3	COPY 4	CH1	TP103	E83	CT101
			CH2	TP123	E83	CT121
			CH3	TP143	E83	CT141
			CH4	TP163	E83	CT161







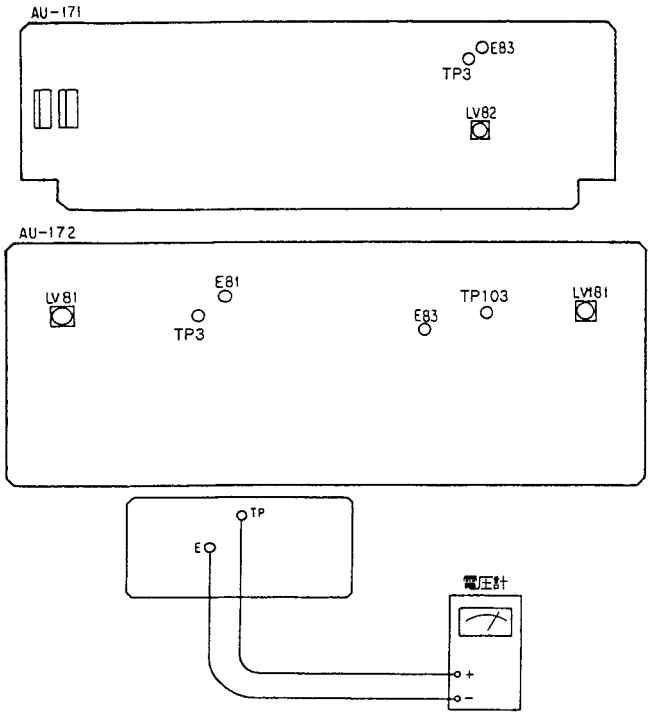
4-10. 消去ヘッドダミーコイル調整（CCP-2310F, 2410F）

測定器　：電圧計

手順）

1. CCP-2310FのSIDEセレクターを「A＋B」にセットする。CCP-2410Fの調整の場合は，SIDEセレクターの設定が最初から「A＋B」になっています。
2. サービスモード状態にする。但し，CCP-2410Fの調整の場合はセット内部SY-3基板上のスイッチの操作でサービスモード状態にする。
   （注意：カセットテープを入れないこと。P3-5参照）
3. コピー釦を押し，AU-171，AU-172基板上の各テストポイントの電圧を測定する。
4. 次にSIDEセレクターを「A」に切り換え，各々のCOPYに対応するテストポイントの電圧測定する。それからSIDEセレクターが「A＋B」のときに測定した電圧との差が3mV以内になるようダミーコイルで調整する。
   CCP-2410Fの調整の場合は，いずれか一方のAU-172基板のテストポイントTP8を接地することによりSIDEセレクターの状態が「A」になります。（接地しない場合は「A＋B」の状態です。）

基　板	CCP-2310F	CCP-2410F	レベルメーター接続		調整
			＋端子	－端子	
AU-171	COPY 1	COPY 1, 2	TP3	E83	LV82
AU-172	COPY 2	COPY 3	TP3	E81	LV81
	COPY 3	COPY 4	TP103	E83	LV181



4-11. 録音入力レベル, 周波数特性調整 (CCP-2310F, 2410F)

注意　：この調整に入る前に必ずバイアス電流仮調整が終っている事

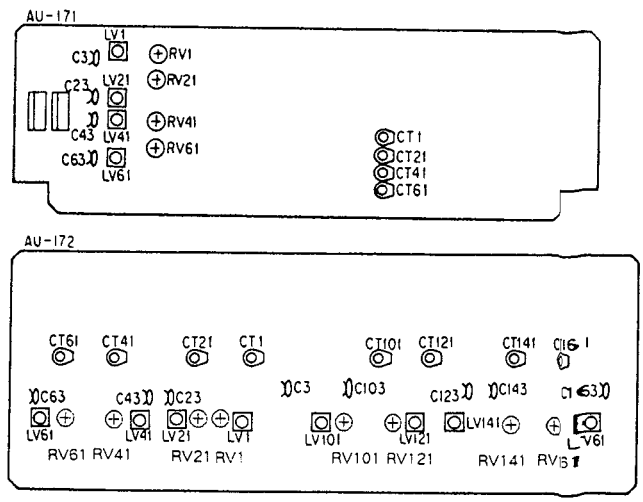
測定器：オシレーター
レベルメーター
生カセットテープ（60分用）
標準再生機（高性能, 且つ調整が済んでいる事）

手順)

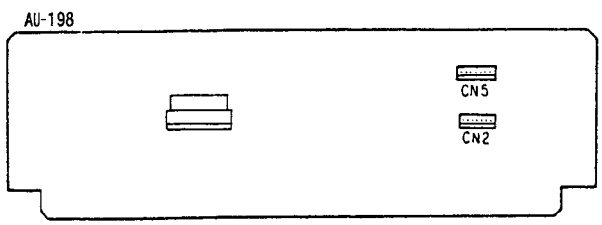
1. CCP-2310FのAU-198基板上のコネクターCN2に接続されているコードをCN5に差し替える。
2. CCP-2310FのSIDEセレクターを「A＋B」に設定する。
3. POWERスイッチをONにする。
4. CCP-2310Fのオリジナル及び各コピーに測定用生テープをセットする。
5. オシレーターの＋端子をAU-198基板上TP2に－端子をE2に接続して, 0dB, 5kHzの信号を入力しながらCOPY釦を押す。
6. コピー終了後, コピーされたテープを標準再生機にて再生し, レベルが315Hzにて0±1dBになるように各々の録音レベル調整用RVを繰り返す。
7. 次に, SIDEセレクターを「A」に切り換え, 手順5, 6を繰り返す。

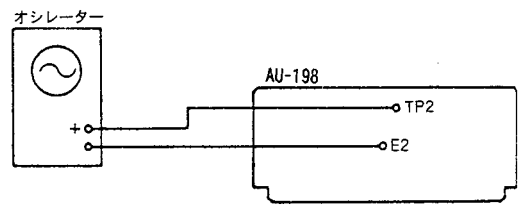
(録音周波数特性)

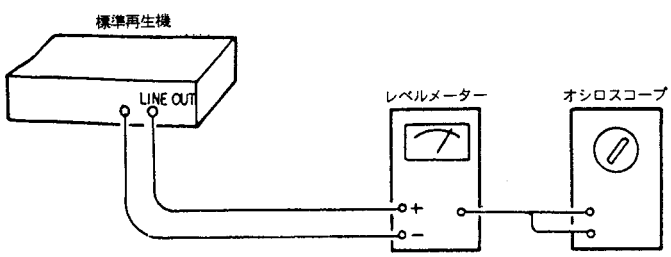
8. オシレーターの接続を変えずに, 下記の信号を入力しながらCOPY釦を押す。
   －20dB,　5kHz
   －20dB,　100.8kHz
   －20dB,　160kHz
9. コピー終了後, コピーされたテープを標準再生機にて再生し, 各周波数でのレベルが規格に入るように, AU-171, 172基板上の調整用コンデンサ, コイル, トリマーコンデンサの調整, 交換を繰り返す。

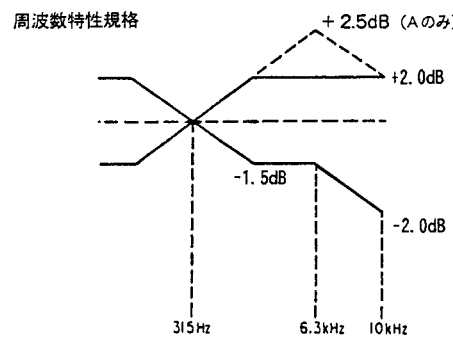


基板	CCP-2310F	CCP-2410F	CH	調整点			
				レベル	周波数		
					6.3kHz	10kHz	6.3kHz及び10kHz
AU-171	COPY 1	COPY 1 COPY 2	CH1	RV1	C3	LV1	CT1
			CH2	RV21	C23	LV21	CT21
			CH3	RV41	C43	LV41	CT41
			CH4	RV61	C63	LV61	CT61
AU-172	COPY 2	COPY 3	CH1	RV1	C3	LV1	CT1
			CH2	RV21	C23	LV21	CT21
			CH3	RV41	C43	LV41	CT41
			CH4	RV61	C63	LV61	CT61
	COPY 3	COPY 4	CH1	RV101	C103	LV101	CT101
			CH2	RV121	C123	LV121	CT121
			CH3	RV141	C143	LV141	CT141
			CH4	RV161	C163	LV161	CT161









SECTION 1
GENERAL

1-1. SPECIFICATIONS

Power requirments	U model	: 120 V AC 60Hz
	EK model	: 220/240 V AC 50/60 Hz
Power consumption	U model	: 0.67 A
	EK model	: 67 W
Recording system	4-track 4-channel/4-track 2-channel	
Tape cassette	Normal TYPE I cassette	
	(C-30, C-46, C-60, C-90)	
	(TYPE II and TYPEIV tapes not usable)	
Tape speed	76 cm/s (30 ips)	
Copy time	Approx. 2 min.	
	(with C-60 cassette) (per run)	
Rewind time	Approx. 45 sec. (with C-60 cassette)	
Frequency response	40-10,000 Hz	
Recording bias frequency	Approx. 550 kHz	
Signal to noise ratio	49 dB, peak level recording	
	(JIS-A, WRMS)	
Total harmonic distortion	Within 3 %	
Wow and flutter	Less than 0.23 % (WRMS)	
Crosstalk	Better than 53 dB	
	(between track 2 and 3, at 1 kHz)	
Drive control connector	CCP-2310F : Output (13-pin DIN)	
	CCP-2410F : Input (13-pin DIN),	
	Output (13-pin DIN)	
Dimensions	Approx. 328 × 160 × 382mm (w/h/d)	
	(Approx.13 × 63/8 × 15 1/8 inches)	
	not including projecting parts and controls	
Mass	Approx. 10.2 kg (22 lb 8 oz)	
Accessories supplied	AC power cord (1)	
	Head cleaning tip (1 set)	
	Dust cover (1)	
	Control cable with 13-pin DIN connectors	
	(1, supplied with the CCP-2410F only)	
	Operation Manual	

1-2. FEATURES

CCP-2310F Audio Cassette Duplicator

- High speed cassette duplication at 16 times normal speed.
- Side selector to select one-side duplication or both-side duplication.
- Auto-copy function to activate a series of tape operation automatically at the press of a button.
- Short tape indicator to show that duplication may be uncompleted due to a short copy tape and that a check is required.
- Control output terminal for connecting an additional audio cassette duplicator with copy section only.
- Playback volume controls with level meters for each channel of the original tape.
- Two-reel motor direct drive system per each positon.
- End beep when duplication is finished.
- The static suppression brush for preventing electrostatic noise.
- Up to 10 CCP-2410Fs can be connected to CCP-2310F.
- Long-life ferrite head.

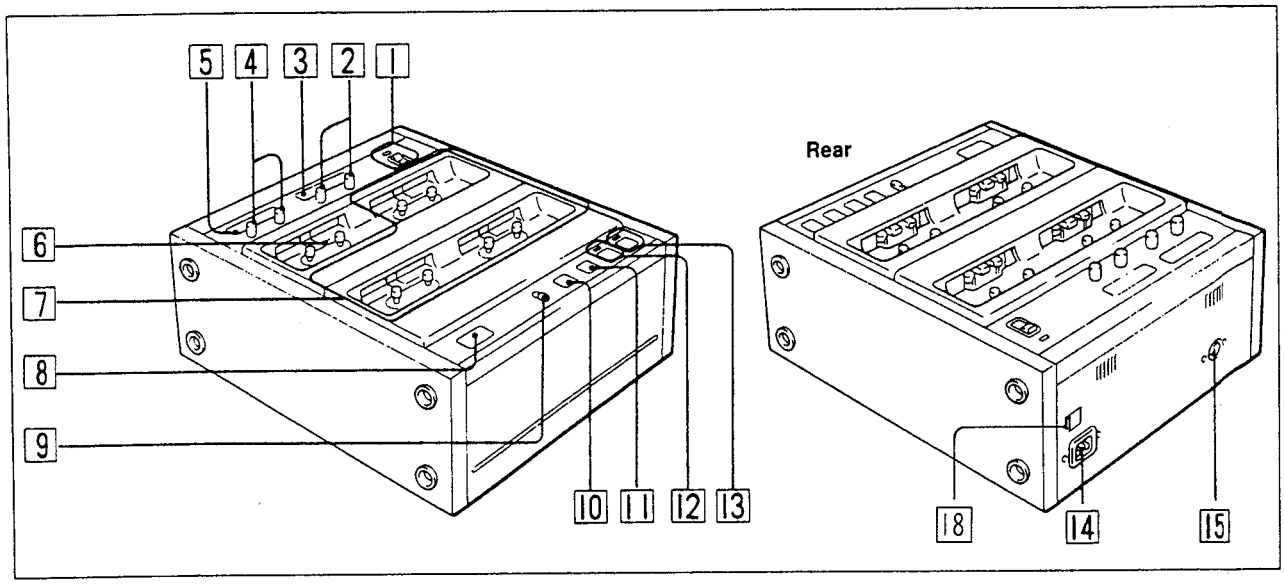
CCP-2410F Audio Cassette Duplicator

When connected to CCP-2310F:

- High speed duplication onto 4 copy cassettes at 16 times normal speed.
- Tape operation fully controlled by the connected CCP-2310F.
- Long-life ferrite head.

1-3. LOCATION AND FUNCTION OF CONTROLS

CCP-2310F



1 Power switch and indicator
Turn the switch ON and the indicator lights up. The SHORT TAPE indicators also light up. After four seconds of warming up, the SHORT TAPE indicators will go off and the unit will be ready to operate.

2 Side B playback level controls
The knobs L and R control the left and right output levels of the playback sound respectively.

3 Side B level meters
The meters L and R indicate the left and right output levels of the playback sound respectively.

4 Side A playback level controls
The knobs L and R control the left and right output levels of the playback sound respectively.

5 Side A level meters
The meters L and R indicate the left and right output levels of the playback sound respectively.

6 ORIGINAL cassette compartment

7 COPY cassette compartments 1, 2 and 3

8 SHORT TAPE indicators
Lights when the corresponding copy tape reaches the end before the original tape is completely duplicated. (Refer to "SHORT TAPE Indicator" on page 1-6 (E)).
Also lights when there is no tape in the corresponding cassette compartment. The indicators go off when any button but STOP is pressed.

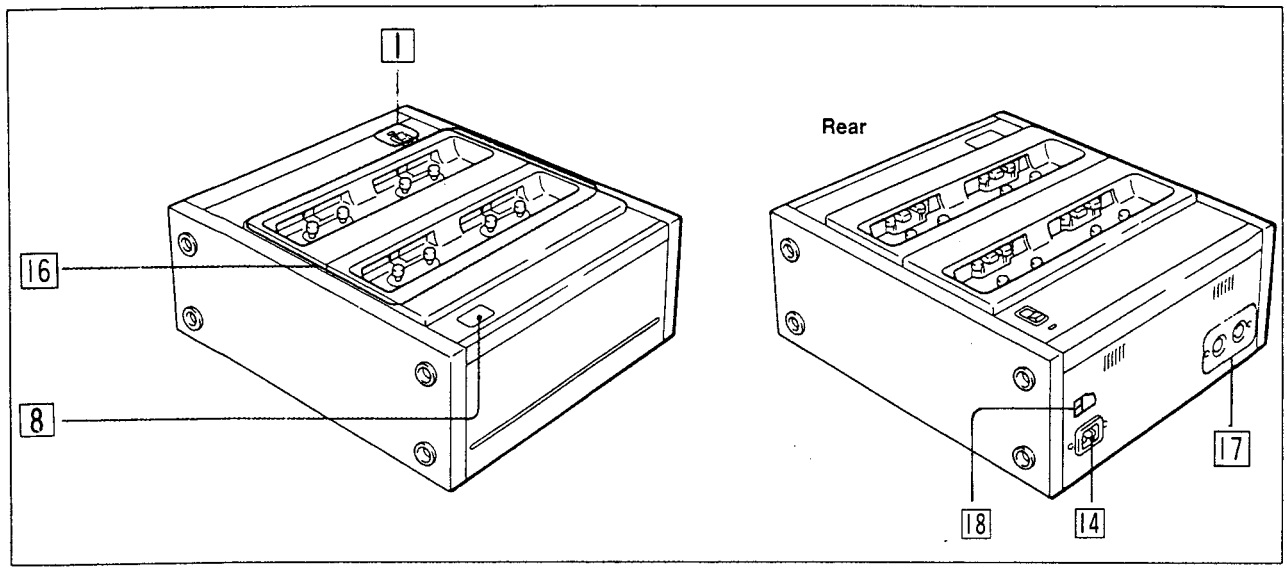
9 SIDE SELECT switch
Selects one side or both sides of the cassette per duplication run.
A : for one side duplication.
A + B : for both sides duplication.

10 REWIND button
Press to rewind the tape(s). Each tape stops automatically at the beginning. The tapes in all connected CCP-2410F duplicators will also be rewound.

11 STOP button
Press to stop the tape(s). The tapes in all connected CCP-2410F duplicators will also stop.

CCP-2410F

[1], [8], [15] and [18] controls have the same function as the ones on the CCP-2310F.



[12] COPY button and indicator

Press to duplicate the tapes. The indicator lights and playback of the original tape and recording on the copy tape start immediately. Recording also starts in all connected CCP-2410F duplicators. When duplication is finished, all the tapes stop. The indicator goes off and the end beep sounds.

[13] AUTO COPY button and indicator

Press to rewind and then duplicate the tapes. The indicator lights and all the tapes are rewound to the beginning. When all the tapes have been rewound, the AUTO COPY and COPY indicators light and then playback of the original tape and recording on the copy tapes start. Recording also starts in the connected CCP-2410F duplicators. When duplication is finished and all the tapes come to the end, the COPY indicator goes off. With the AUTO COPY indicator still lit, all the tapes, except the tape with its SHORT TAPE indicator lit, start to rewind. When all the tapes are rewound to the beginning, the AUTO COPY indicator will go off and the end beep will sound.

[14] AC IN socket

Connect the supplied AC power cord.

[15] LINE/CONTROL OUTPUT connector (13-pin DIN)

Supplies the track signal of the original tape and the driving signal to additional duplicators. Connect to the LINE/CONTROL INPUT connector of CCP-2410F.

[16] COPY cassette compartments 1, 2, 3 and 4

[17] LINE/CONTROL connectors (13-pin DIN)

INPUT: Accepts the track signal of the original tape and the driving signal from CCP-2310F. Connect to the LINE/CONTROL OUTPUT connector of CCP-2310F.

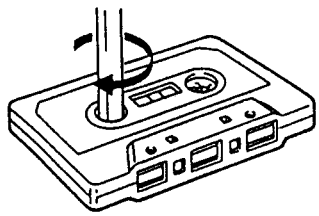
OUTPUT: Supplies the track signal of the original tape and the driving signal to an additional duplicator. Connect to the LINE/CONTROL INPUT connector of the additional CCP-2410F.

[18] Voltage selector (for EK model only)

1-4. PREPARATION

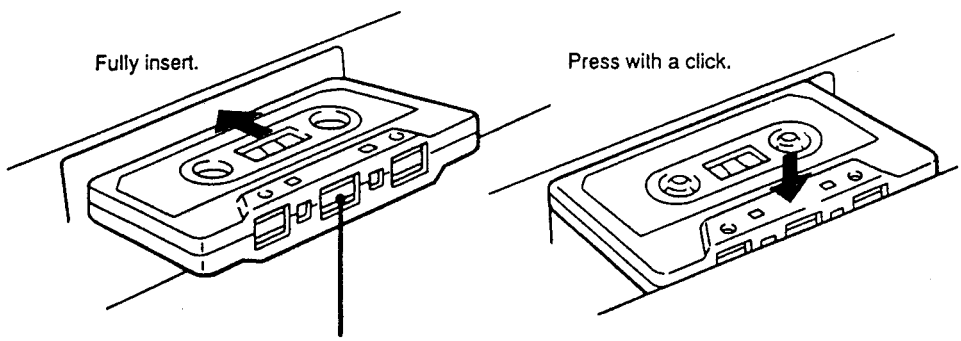
Cassette Insertion

1 Before inserting a cassette, take up any slack in the tape.

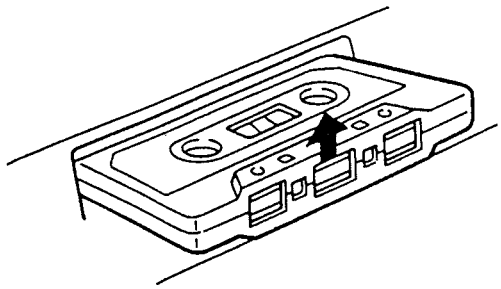


2 Check the cassette sides.
For both-side duplication: To duplicate the content of the original cassette side A onto the side A of the copy cassette, install the cassettes with the same side up.
For one-side duplication: Insert the original and copy cassettes with the required side up.

Notes on cassettes
- Use normal TYPE I cassettes.
- It is advisable to use cassettes of the same brand, as, even if the cassettes have the same rated duration, they may differ a little in length, depending on the manufacturers. This prevents incomplete duplication.
- Use of a 120-minute cassette tape is not recommended. Frequent switching of the tape operation mode can result in the tape becoming tangled because the tape is very thin and can easily be stretched.
- Remember that duplication can be made, even though the copy cassette has had the safety tabs for preventing accidental erasure removed.
- The recording of an original cassette will deteriorate by several decibels at 10 kHz after it has been duplicated 100 times. If it should be duplicated more than 100 times, prepare extra original cassettes.

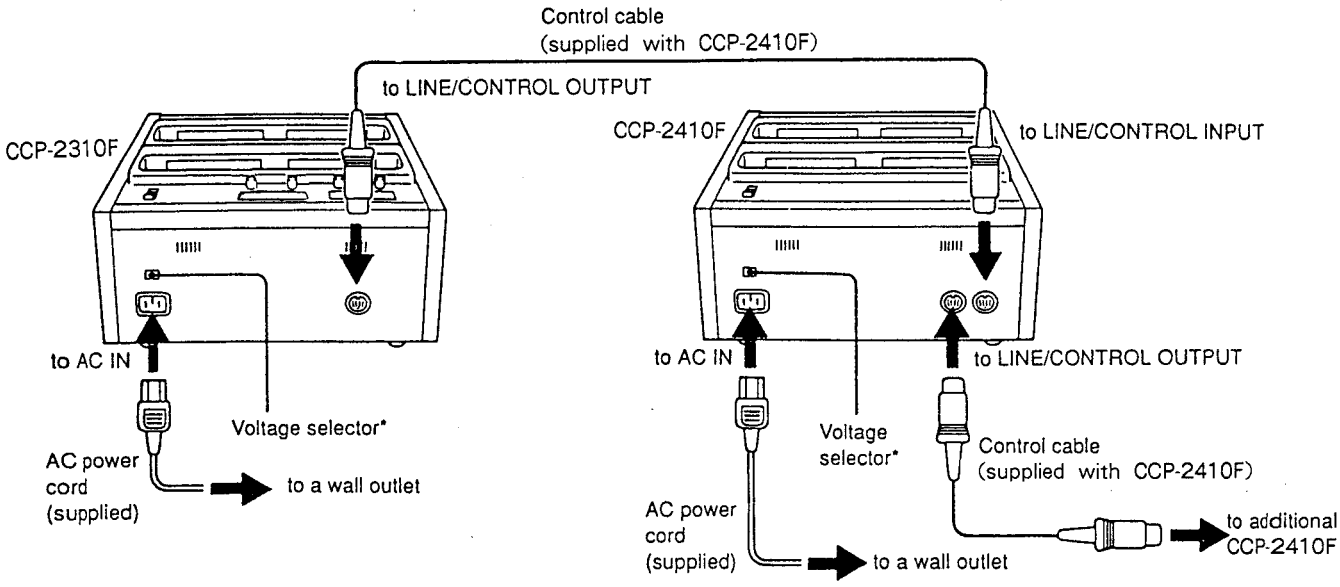


To remove
First lift off the tape-path side and then remove the cassette.



Connection

Connect the LINE/CONTROL OUTPUT connector and the LINE/CONTROL INPUT connector.

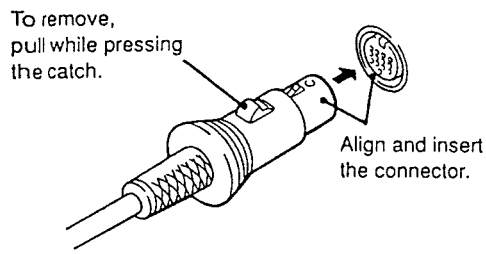


Notes

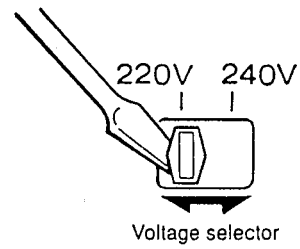
- You can connect up 10 CCP-2410Fs in series.
- Before making connections, be sure to turn off the power.

Control cable

Connect the LINE/CONTROL OUTPUT connector and the LINE/CONTROL INPUT connector.

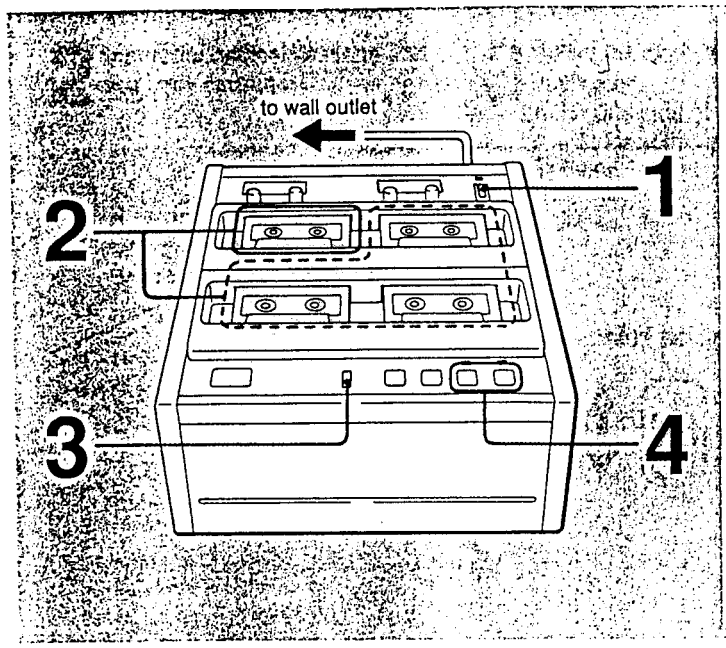


* For the EK model
If your unit is equipped with the voltage selector on the rear panel, be sure to set it to your local power supply before connecting the AC power cord.

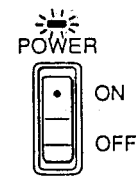


1-5. DUPLICATION

Five-minute warming up is recommended before starting the unit .
During warming up, you can clean the heads



1 Set the POWER switch to ON.
The indicator lights up.
Allow 4 seconds for warming up.



To rewind the tape(s) independently, insert only the cassette(s) to be rewound and then press the REWIND button. Each tape will be rewound to the beginning and will stop.

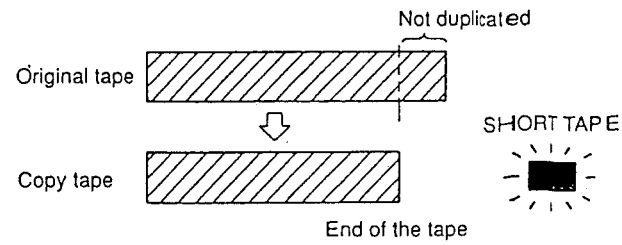
To stop the tapes, press the STOP button.

Adjust the playback level controls by watching the level meters.
Normally set them to the center position.

To use the additional CCP-2410F duplicator
Turn ON the POWER switch of the CCP-2410F and insert copy cassettes. By operating the master duplicator, duplication will begin on the additional duplicator simultaneously.

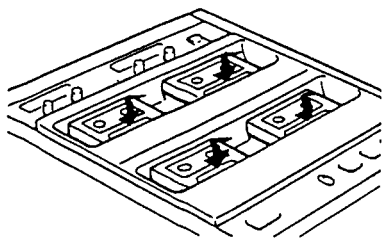
SHORT TAPE Indicator

The SHORT TAPE indicator lights to show that a copy tape was so short that the duplication may not have been made completely and that a check is required. When a copy tape reaches the end before the end of the original tape, it stops but the original tape continues running. The corresponding SHORT TAPE indicator will light. The SHORT TAPE indicator will go off by pressing any button but STOP.

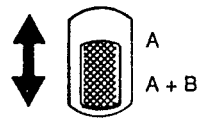


Note
When a copy tape reached the end just a moment after the end of the original tape, the SHORT TAPE indicator may light even if duplication is complete. To confirm duplication use a cassette recorder to play back near the end of the copy tape. The indicator also lights when there is no tape in the cassette compartment.

2 Insert the original cassette and the copy cassette(s).

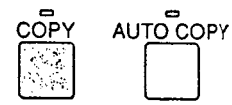


3 Select the cassette side to be duplicated.
A: for one side of the cassette.
A + B: for both sides of the cassette.



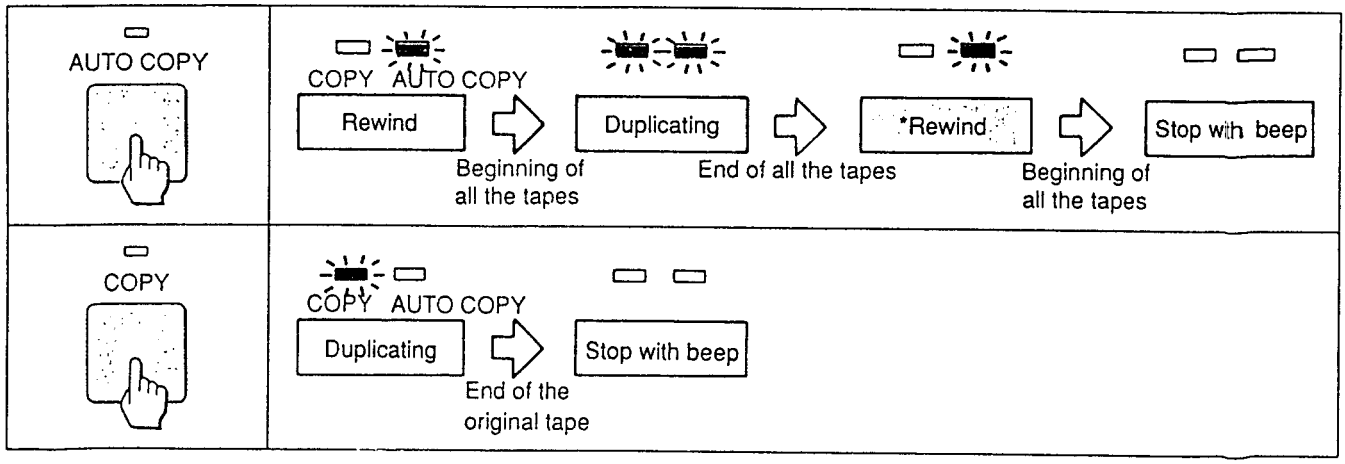
4 Press the AUTO COPY button or COPY button.
AUTO COPY: To rewind each tape, start duplicating and rewind to the beginning again.

COPY: To start duplicating immediately without rewinding.



See the table below.

When the AUTO COPY or COPY button is pressed, the operation of the original and copy tapes is controlled as in the following table.

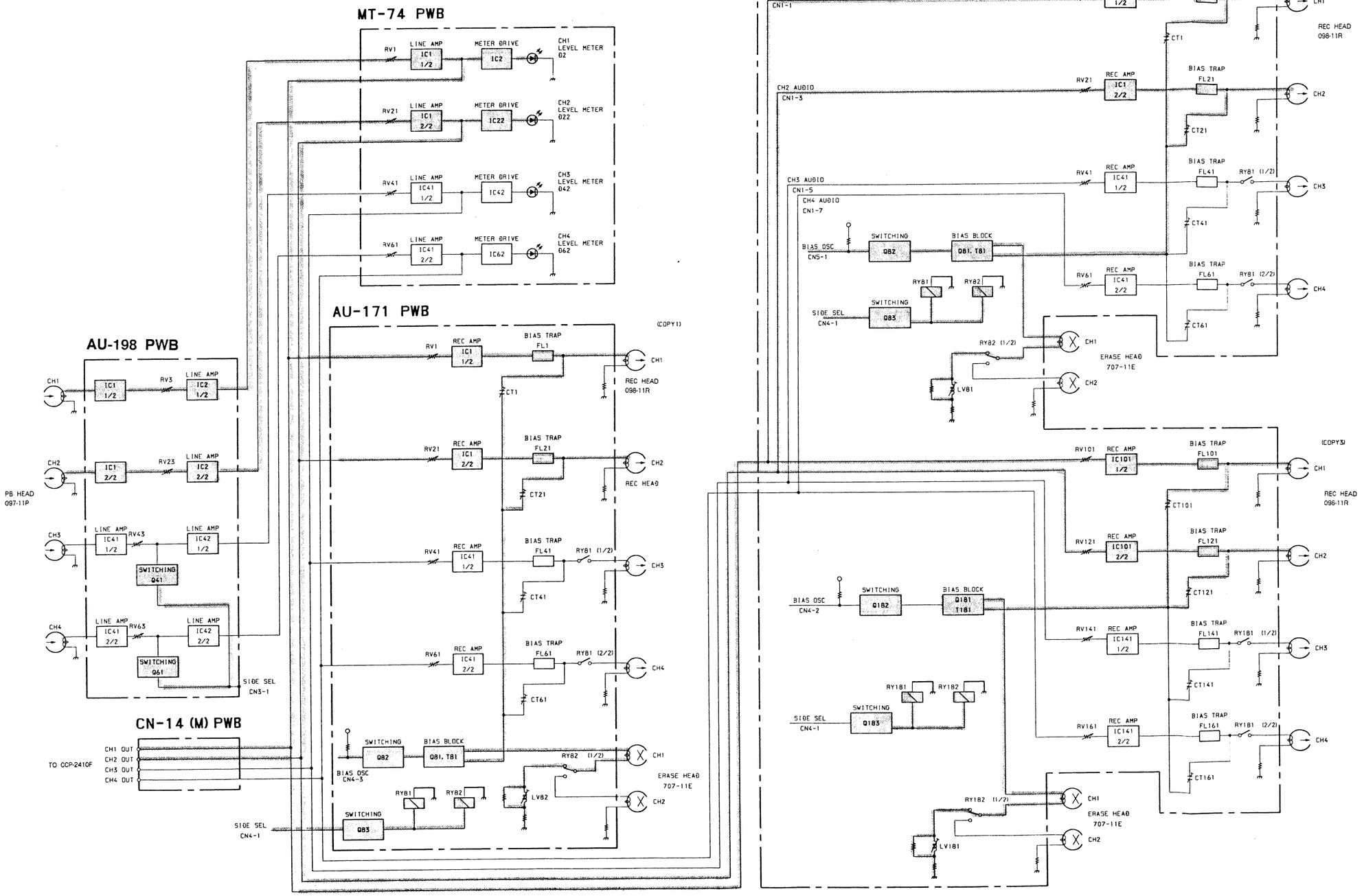


* If the SHORT TAPE indicator is lit, the corresponding tape is not rewound.

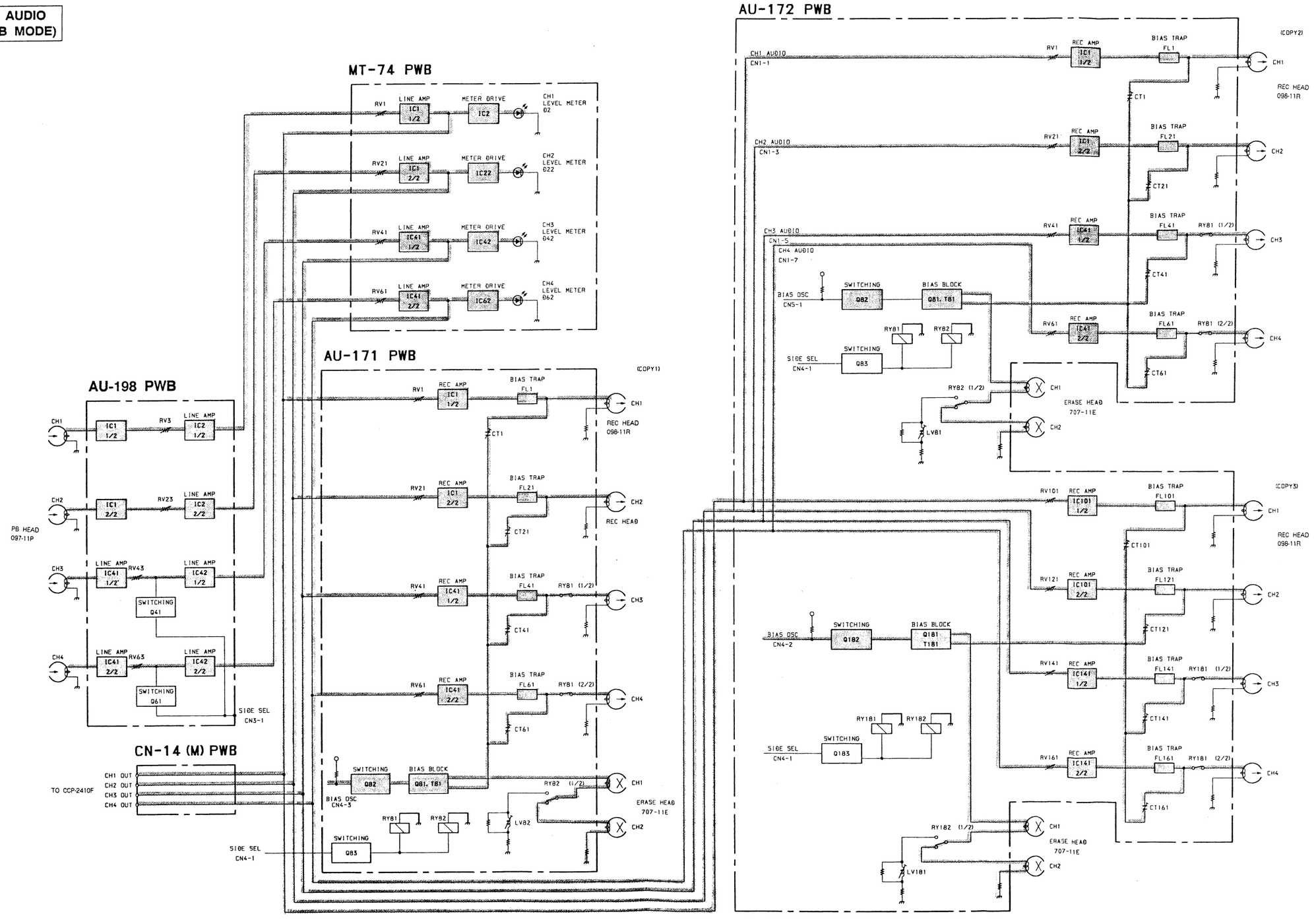
SECTION 2
CIRCUIT DESCRIPTION

2-1. OPERATION STATE

CCP-2310F AUDIO
(COPY A MODE)

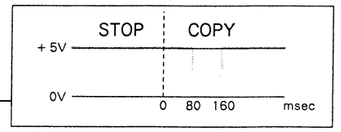


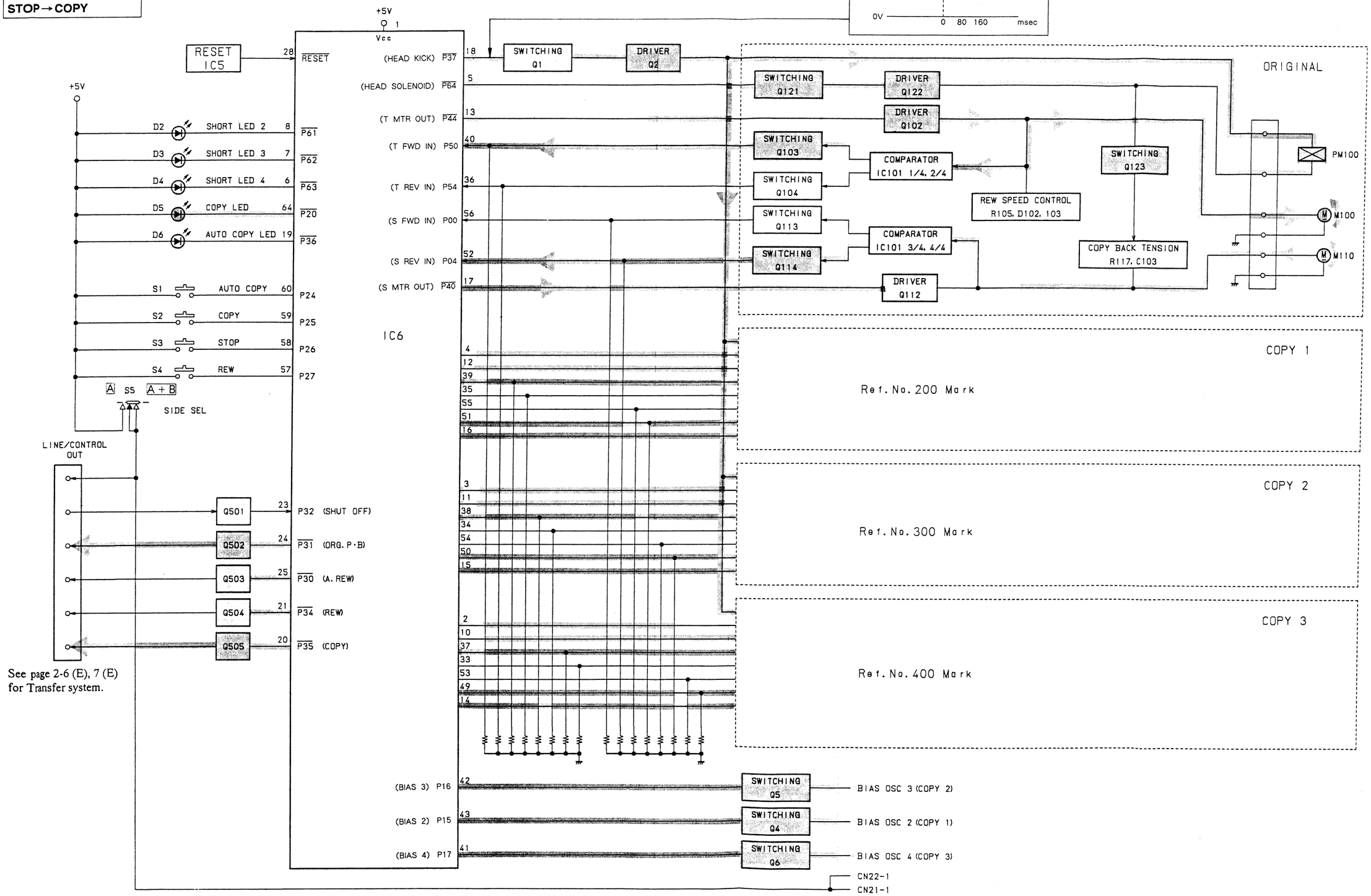
CCP-2310F AUDIO (COPY A+B MODE)



CCP-2310F CONTROL STOP→COPY

; Operating or high portion
; Operating or low portion

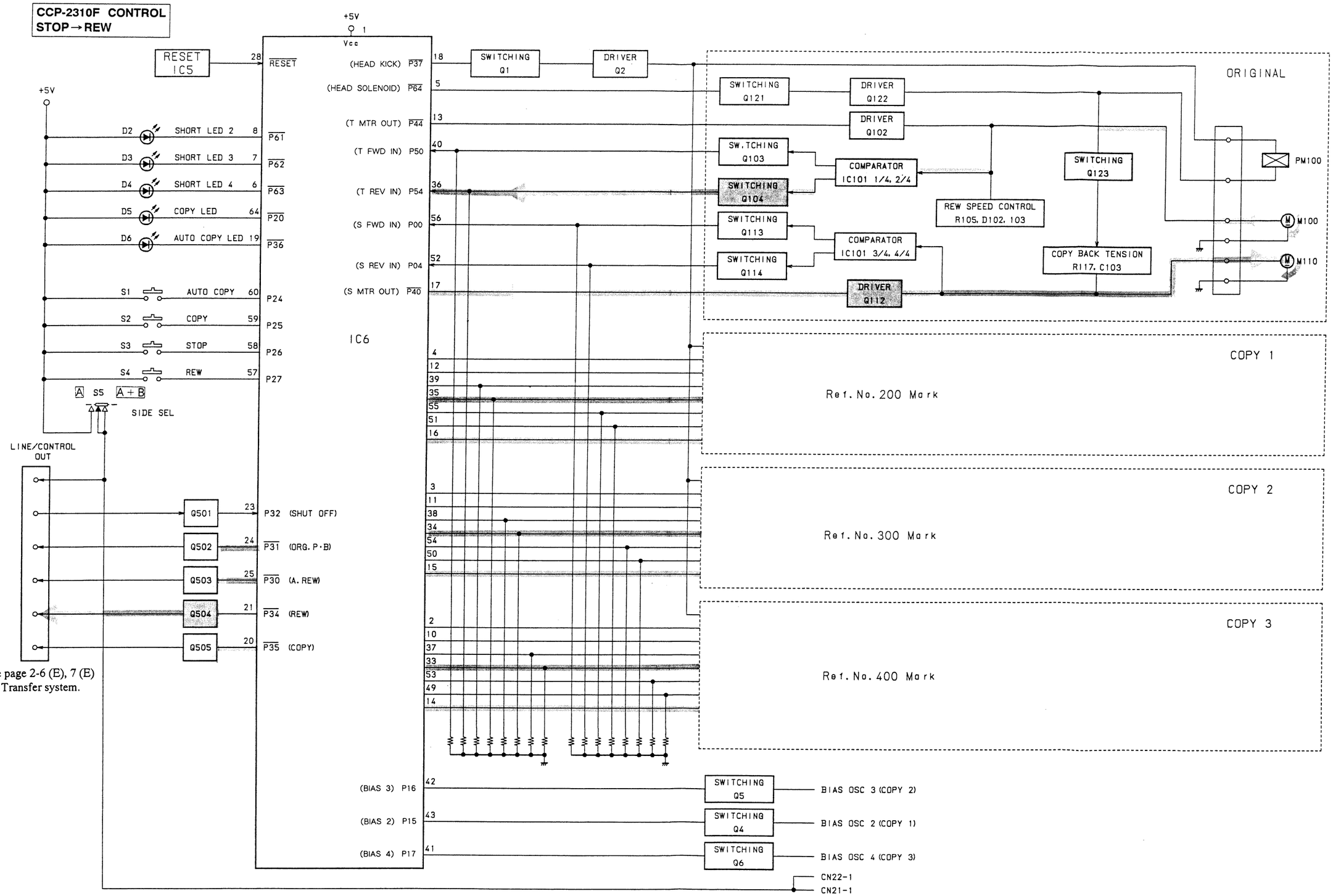




See page 2-6 (E), 7 (E) for Transfer system.

See page 2-6 (E) for Transfer syst

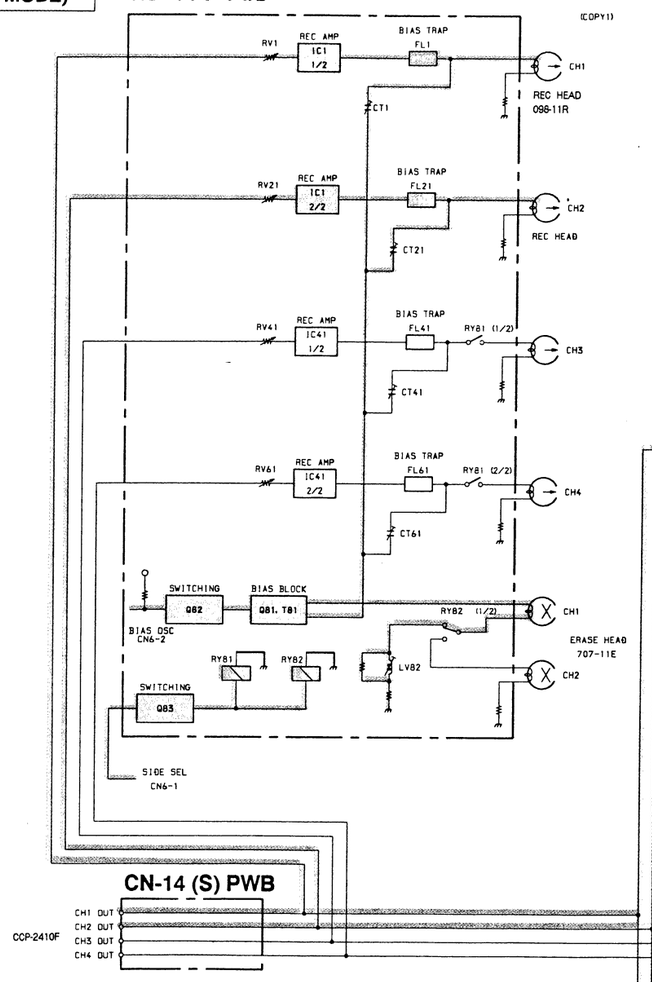
CCP-2310F CONTROL
STOP→REW



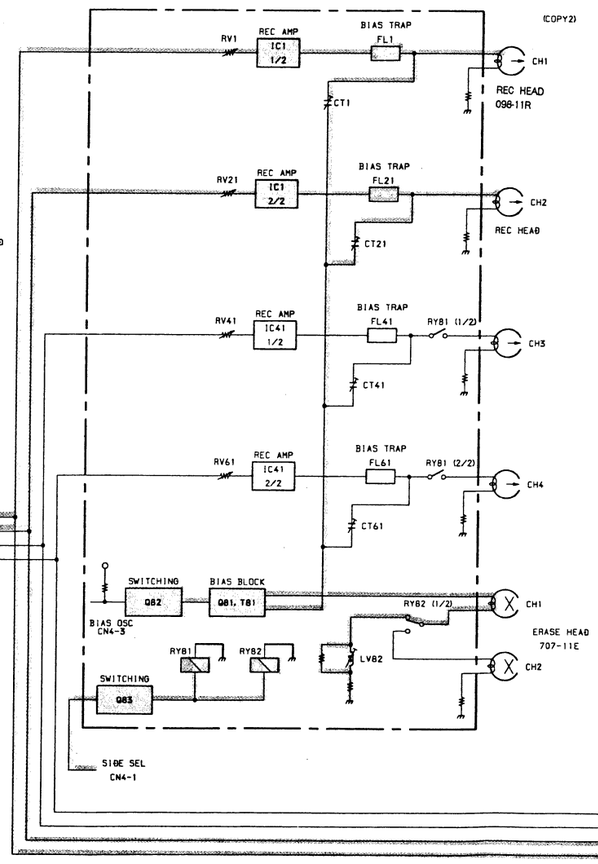
See page 2-6 (E), 7 (E) for Transfer system.

CCP-2410F AUDIO (COPY A MODE)

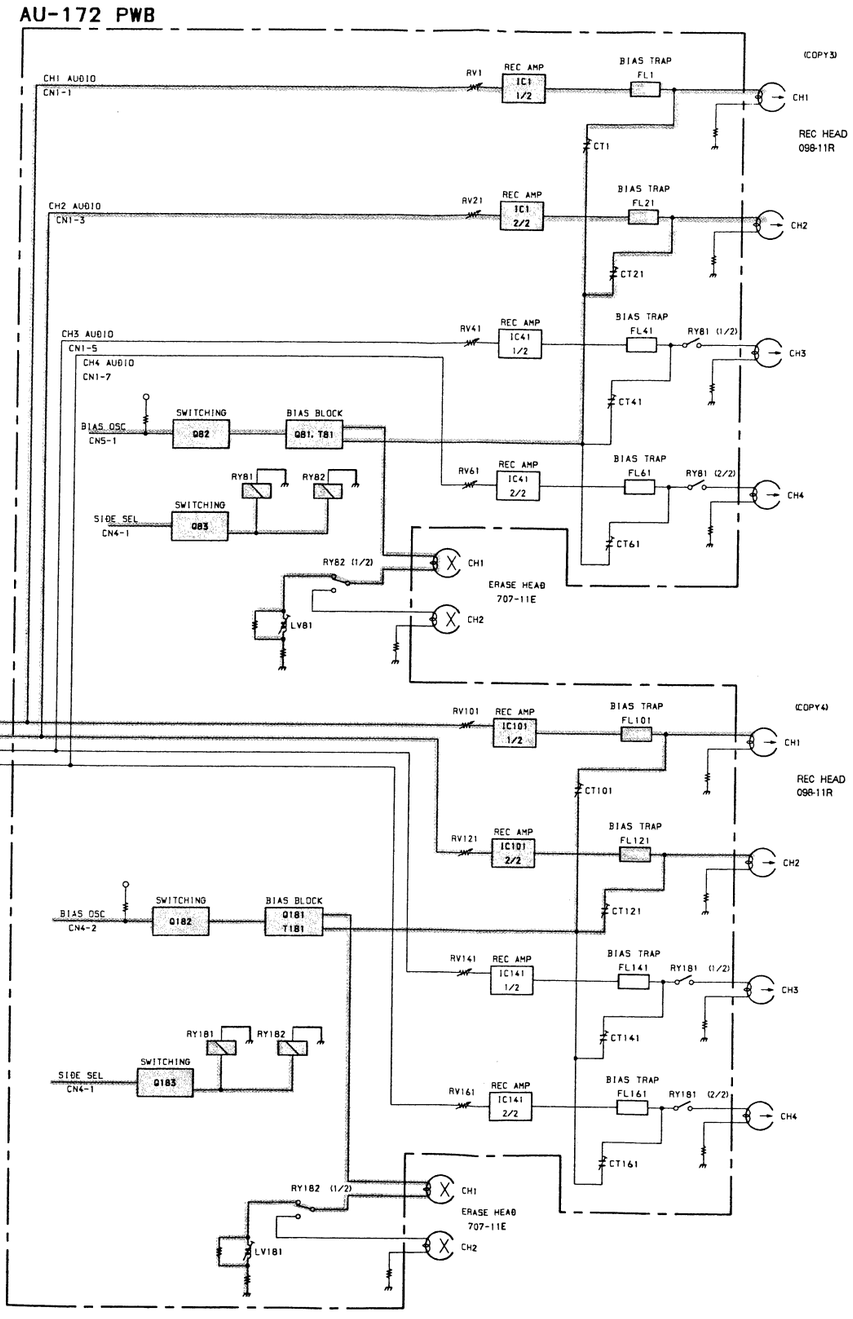
AU-171 PWB



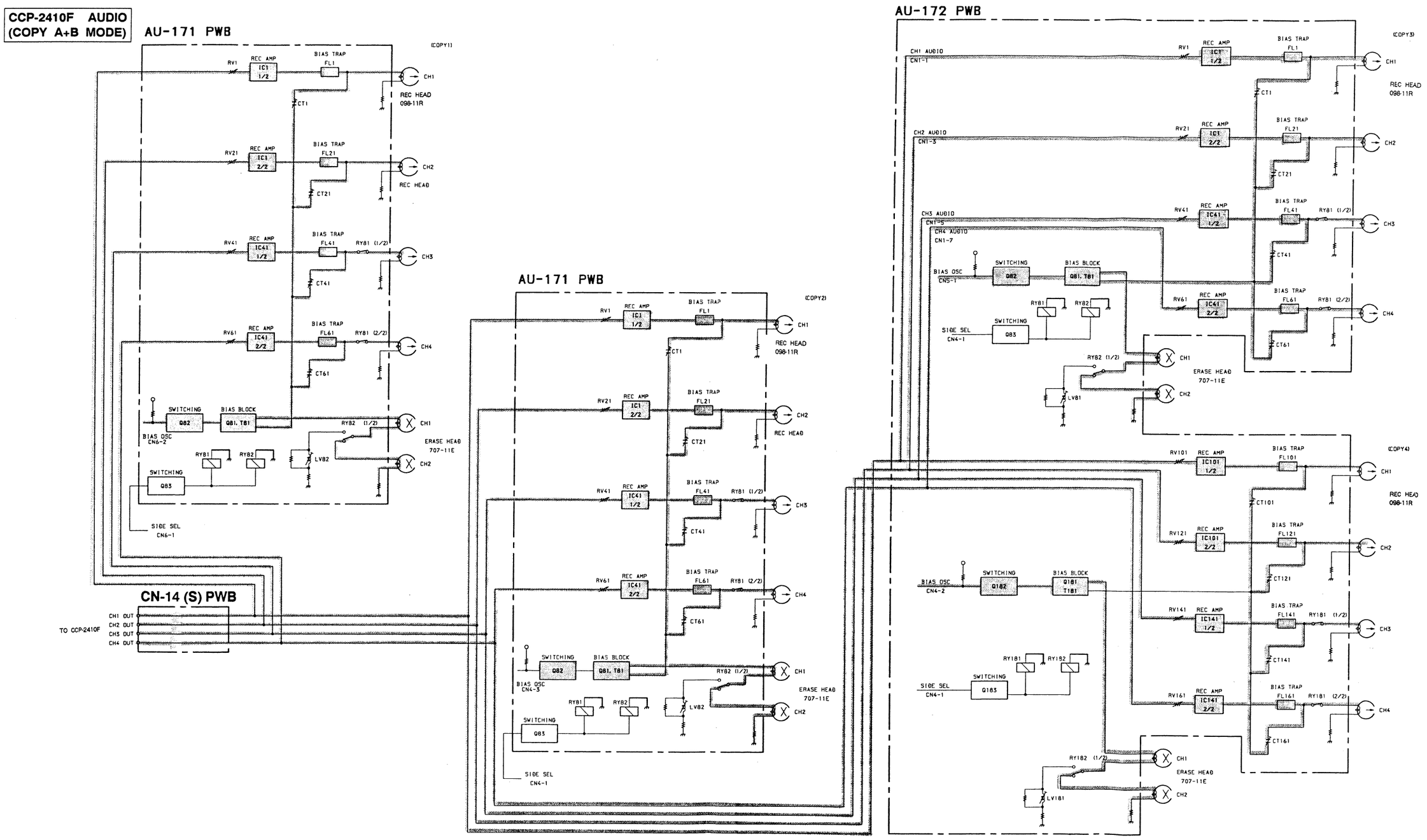
AU-171 PWB



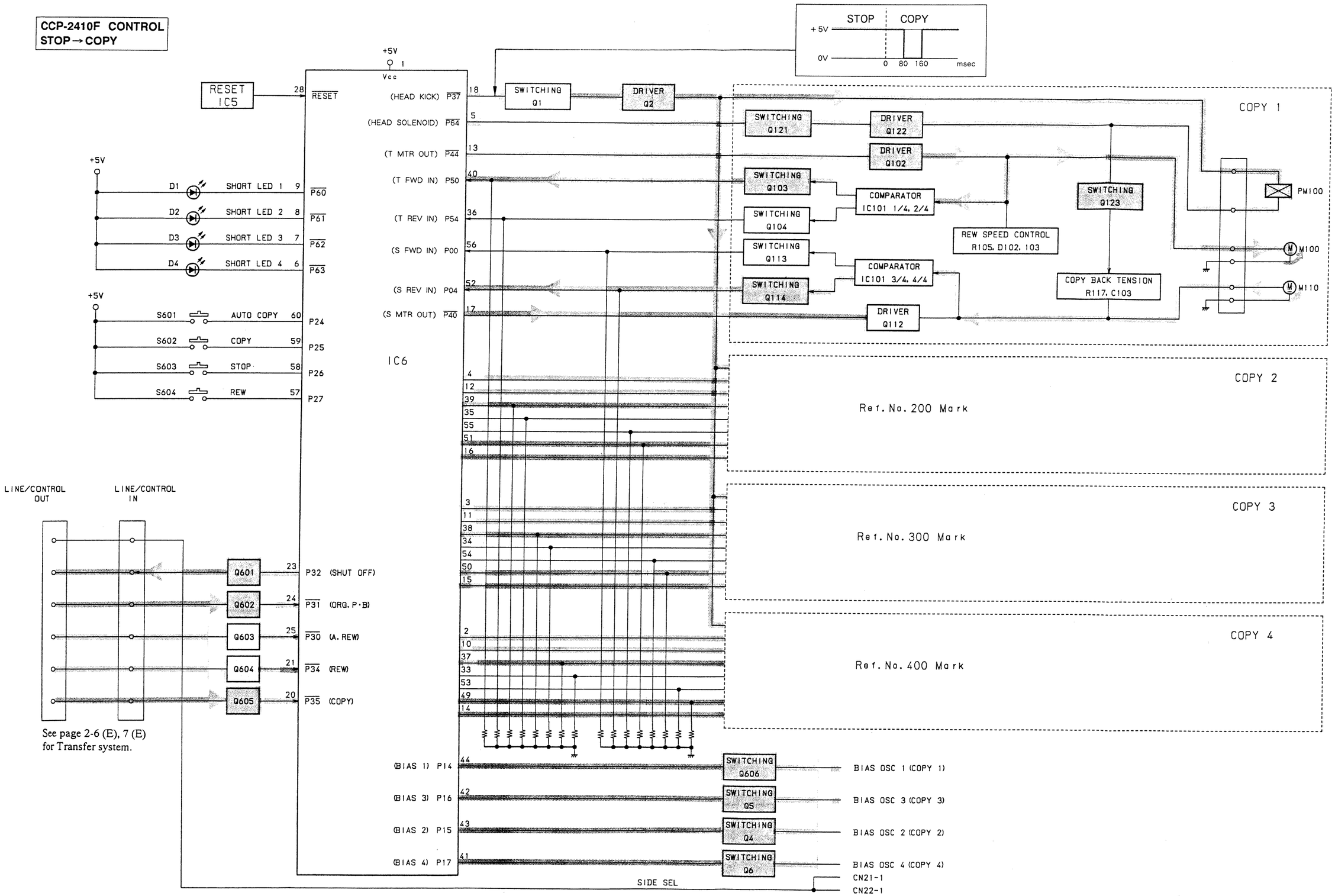
AU-172 PWB



CCP-2410F AUDIO (COPY A+B MODE)

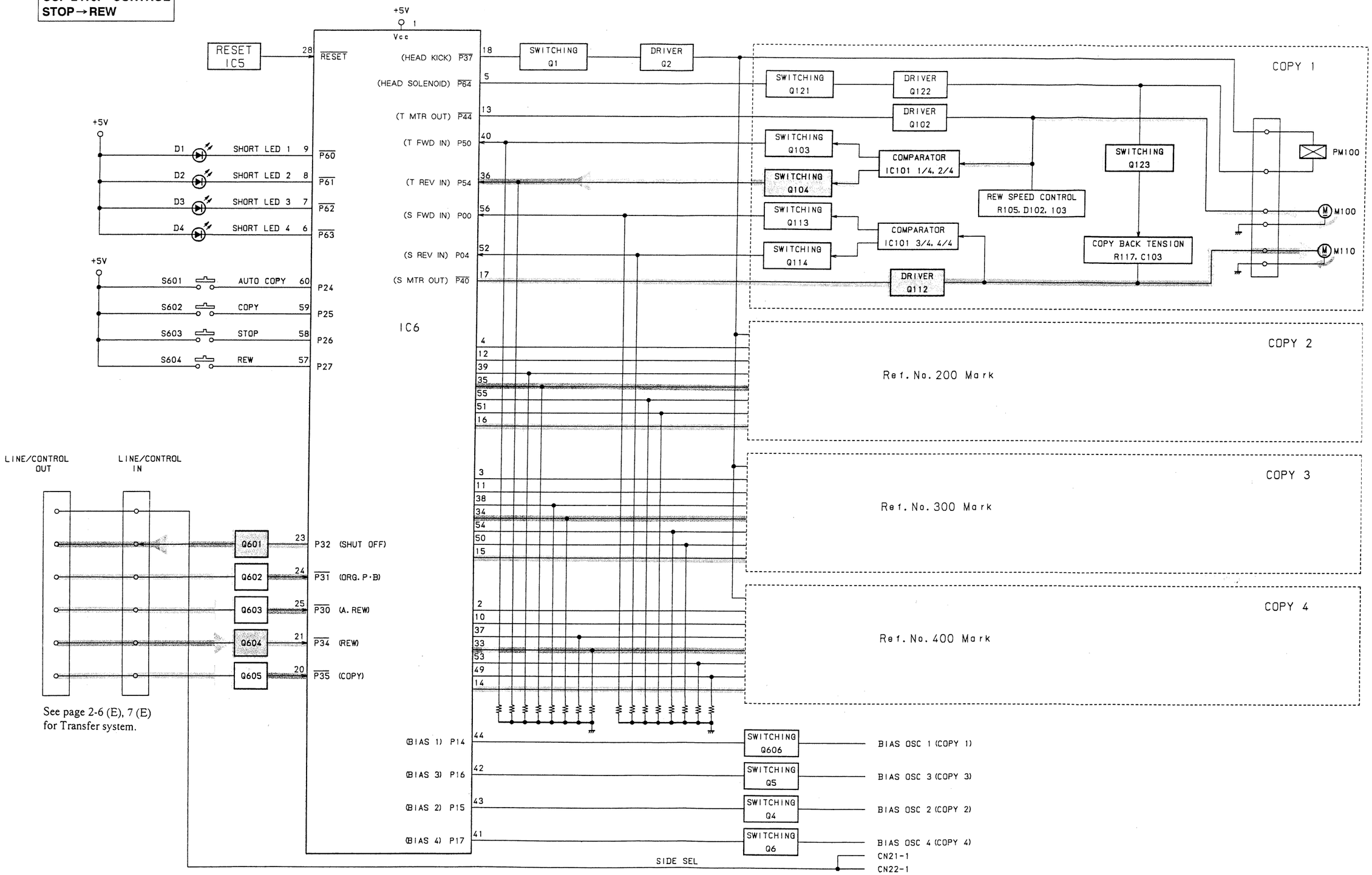


CCP-2410F CONTROL STOP → COPY



See page 2-6 (E), 7 (E) for Transfer system.

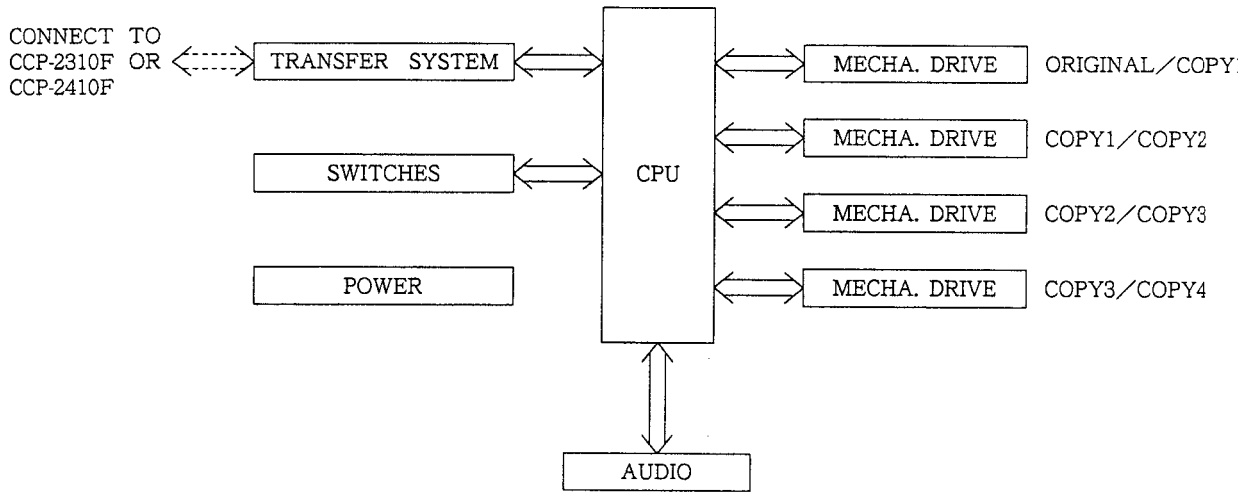
CCP-2410F CONTROL
STOP→REW



See page 2-6 (E), 7 (E) for Transfer system.

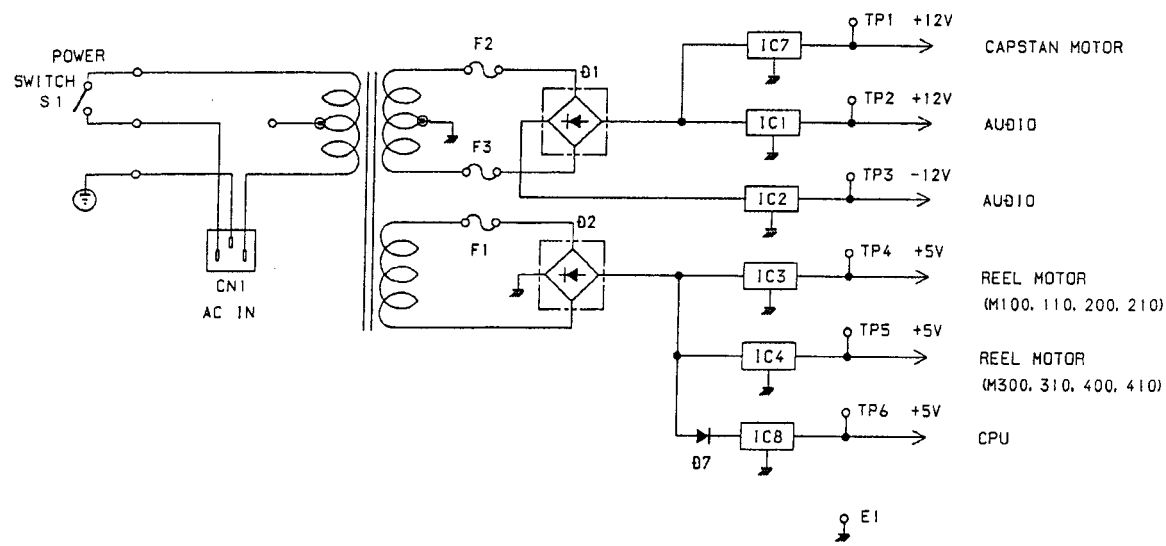
2-2. SYSTEM BLOCK

The circuits of the CCP-2310F/2410F consist of each block as shown below.



2-3. POWER SUPPLY

Six 3-pin regulators are used, as shown below.



2-4. MECHA. DRIVE

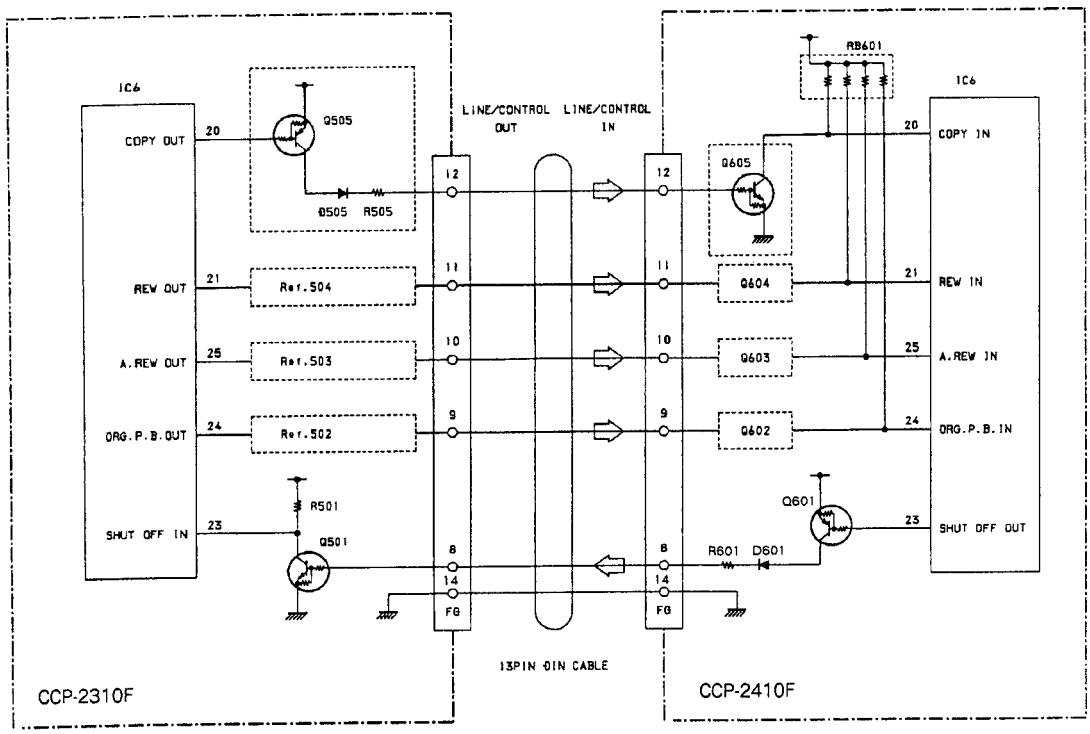
Each reel motor is linked to the CPU with two input signals (FWD IN, REW IN) and one output signal (MTR OUT).
With the input signals, the CPU judges the motor status (run or stop)

With the output signal, the CPU controls the motor rotation.
The control ports for reel motor are as listed below.
IC6 (CPU)

CPU PORT		IC6 (CPU) Pin No.				Operation		
		MD1	MD2	MD3	MD4	STOP	COPY	REW
OUT PUT	T MTR OUT	13	12	11	10	H	L	H
	S MTR OUT	17	16	15	14	H	H	L
INPUT	T FWD IN	40	39	38	37	L	H	L
	T REV IN	36	35	34	33	L	L	H
	S FWD IN	56	55	54	53	L	L	H
	S REV IN	52	51	50	49	L	H	L

2-5. TRANSFER SYSTEM

The digital signal system in the CCP-2310F/2410F consists of three operation signal lines and two status signal lines. If plural units of CCP-2410F are connected, they are connected in parallel as viewed from the CCP-2310F side.



Operation signals.

13PIN CONNECTOR	STOP	COPY	REW	*A.REW
12	L	H	L	L
11	L	L	H	L
10	L	L	L	H

L : If CCP-2410F is not connected,"L" is "OPEN".

* A. REW : Only the tape for which the SHORT TAPE indicator does not illuminate is rewound.
In the AUTO COPY mode, REW→ COPY→A. REW are output.

Status signal (from CCP-2310F to CCP-2410F)

13PIN CONNECTOR	Playback of original tape	others
9	H	L

Status signal (from CCP-2410F to CCP-2310F)

13PIN CONNECTOR	Even one MD in CCP-2410F is running	All MDs in CCP-2410F stop
8	H	L

2-6. SWITCHES

Four switches (A.COPY, COPY, STOP, REW) are provided each for CCP-2310F and 2410F. (For the CCP-2410F, S601 – S604 on the right side of SY-3 board in the set.) The SIDE SELECT switch signal is not input to the CPU but it operates directly the relays on the audio board.
The set provides two special modes for service (cleaning mode and service mode), and these modes can be activated by the switch operation.

SECTION 3
SERVICE OVERVIEW

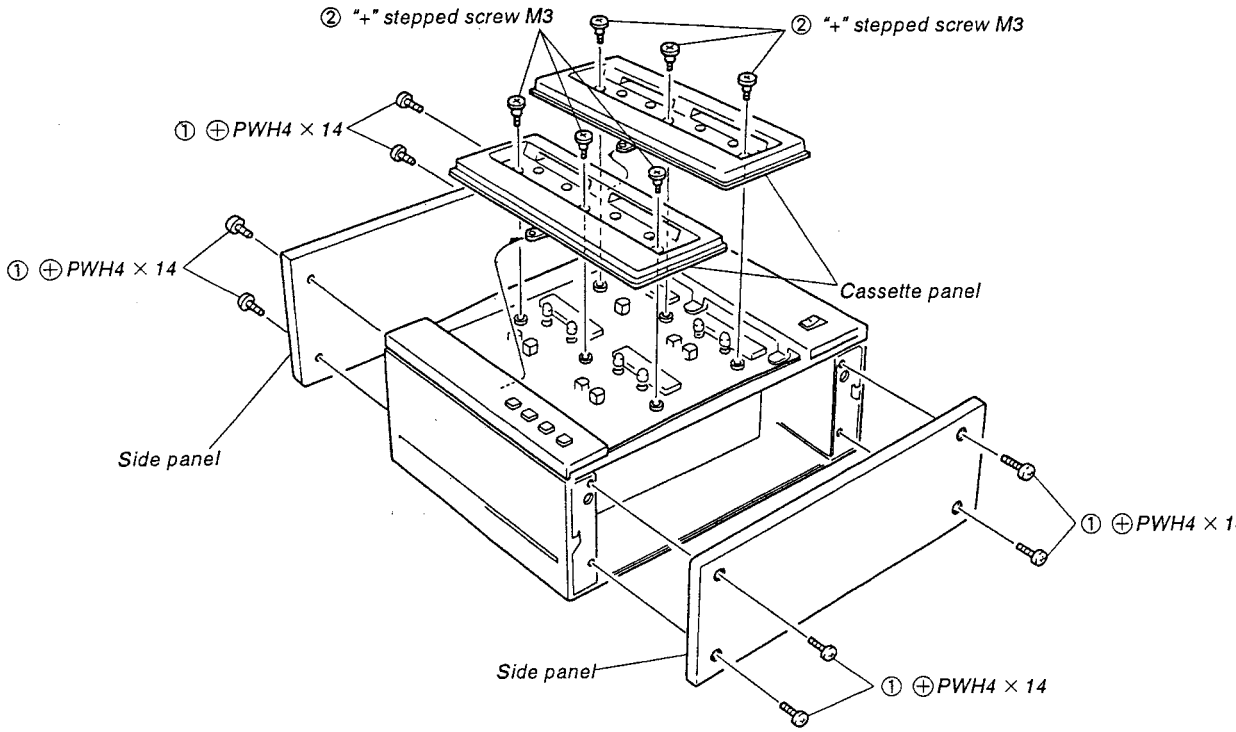
3-1. DISASSEMBLY

[Side panel]

① Remove screws (4 pcs each).

[Cassette panel]

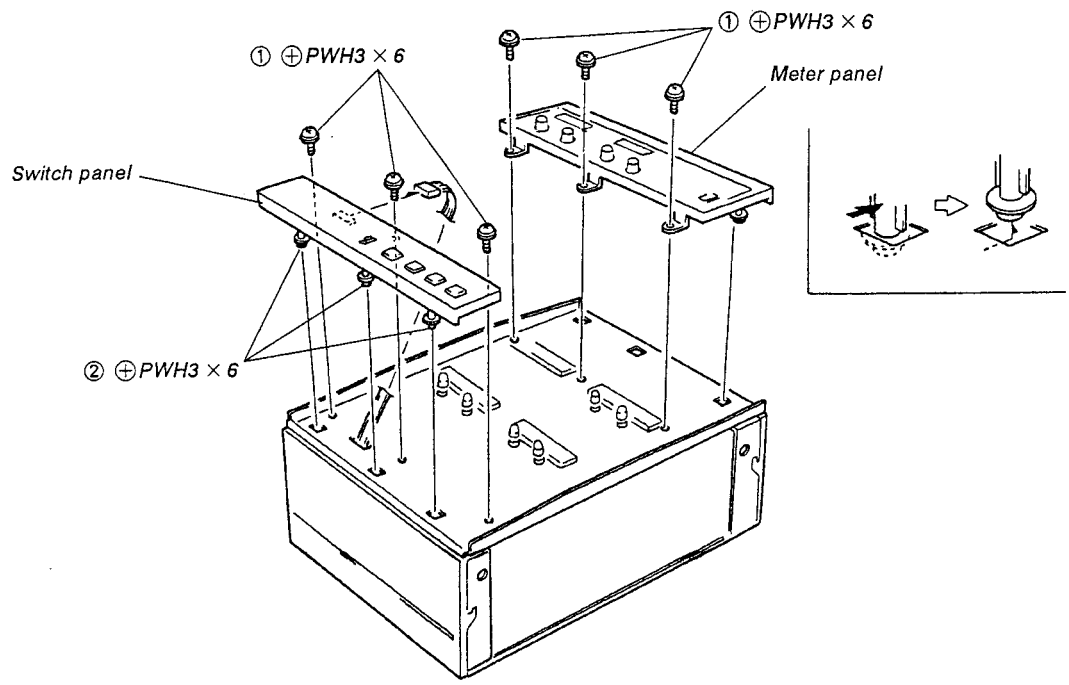
② Remove screws (3 pcs each). Note that a protruded hook is attached to each panel.



[Meter panel] [Switch panel]

① Remove screws (3 pcs each).

② Disengage hooks (3 places each) of chassis.

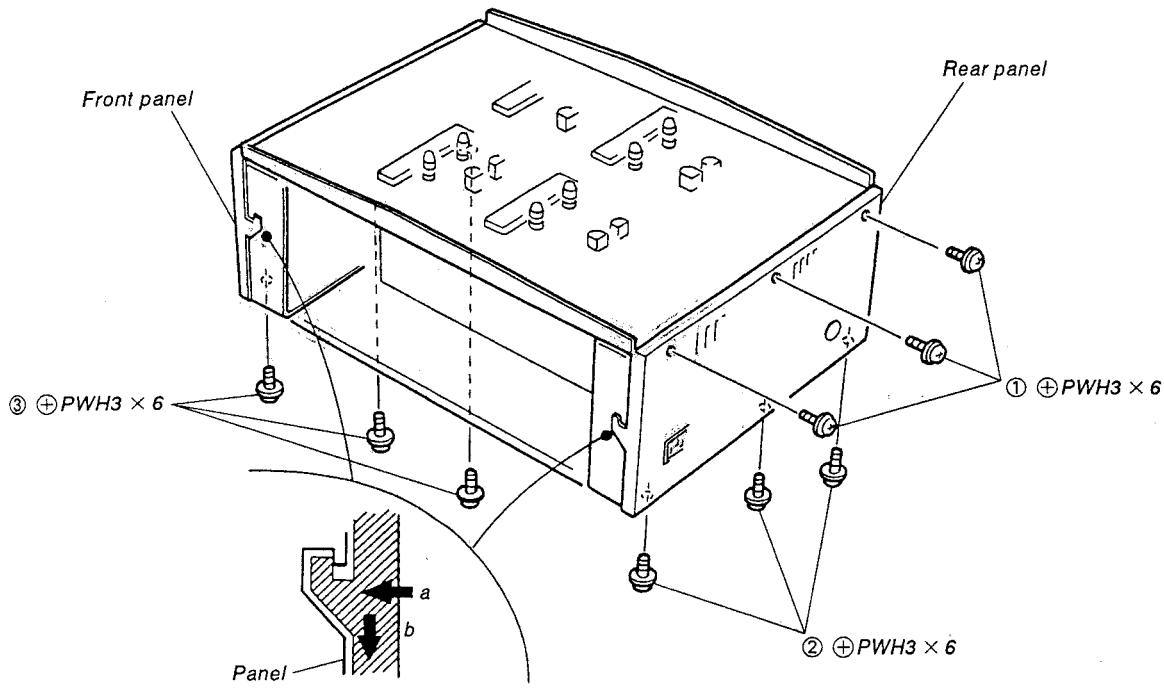


[Rear panel]

①, ② Remove screws (total 6 pcs).
Pushing the panel in direction "a", disengage the hook toward the direction "b".

[Front panel]

③ Remove screws (total 3 pcs).
Pushing the panel in direction "a", disengage the hook toward the direction "b".

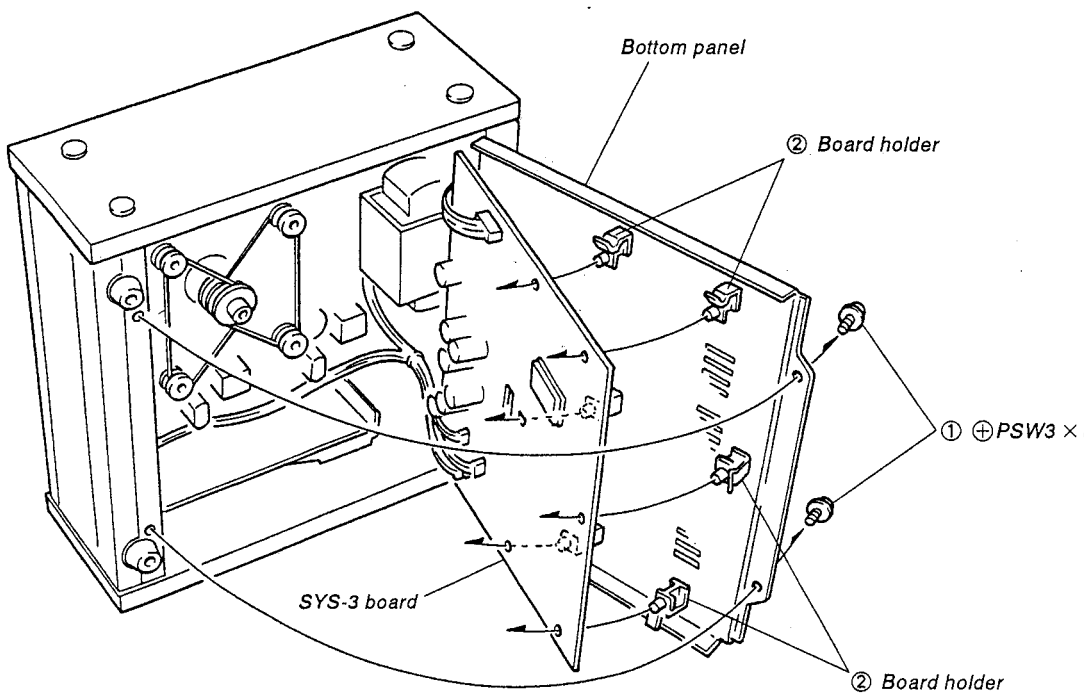


[Bottom panel]

① Remove screws (2 pcs), and the bottom plate will open together with the SY-3 board.

[SY-3 board]

② Remove the board holders (6 places), and the SY-3 board will open.



3-2. CAPSTAN ASSEMBLY

The unit employs 4 sets of capstan assemblies to drive a capstan motor using 2 capstan belts.
Figure 1 shows a layout of capstan assemblies and capstan motor as viewed from rear side of chassis with the bottom plate removed.

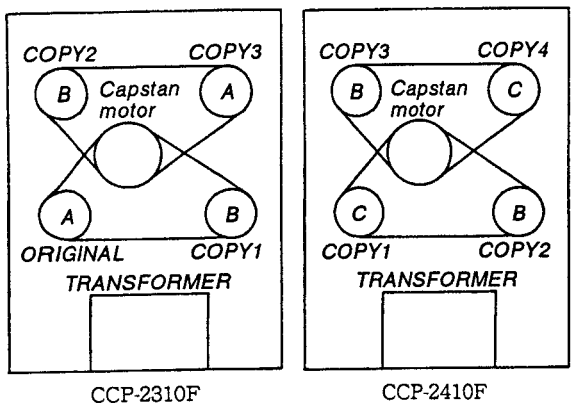


Figure 1

3-2-1. Speed Lag between Original MD and Copy MD

In the CCP-2310F/2410F, the speed in the copy MD is slower by 1% than that in the original MD in order to prevent an unrecorded portion that will otherwise be present due to the fact that the copy tape is rewounded faster than original tape.
This speed lag is done with difference in diameter of flywheels.

3-2-2. Kind and Arrangement of Capstan Assemblies

The kind and combination of capstan assemblies are as shown in Figure 1 and Table 1 ; a total of three kinds are available in the CCP-2310F/2410F.

MD CCP-2310F /CCP-2410F	CCP-2310F	CCP-2410F
ORIGINAL /COPY1	A-2109-010-A Capstan (A) Assy	A-2109-011-A Capstan (C) Assy
COPY1 /COPY2	A-2109-009-A Capstan (B) Assy	A-2109-009-A Capstan (B) Assy
COPY2 /COPY3	A-2109-009-A Capstan (B) Assy	A-2109-009-A Capstan (B) Assy
COPY3 /COPY4	A-2109-010-A Capstan (A) Assy	A-2109-011-A Capstan (C) Assy

Table 1

3-2-3. Identification and Dimension of Capstan Assemblies

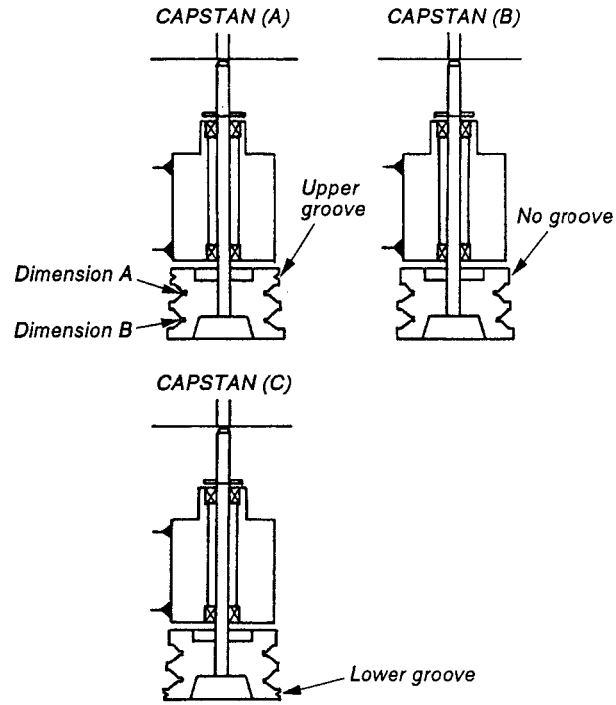


Figure 2

Identification of capstan assemblies :
1. Capstan (A) assembly···Upper groove in flywheel
2. Capstan (B) assembly···No groove
3. Capstan (C) assembly···Lower groove in flywheel

Flywheel inner diameter :

	Capstan (A) Assy	Capstan (B) Assy	Capstan (C) Assy
Dimension A	19.87	20.0	20.07
Dimension B	20.07	20.0	20.07

Note : Replace the capstan assembly with the same kind of capstan assembly when replacement is necessary.
Also, engage the belt at the same position, otherwise the speed will change.

3-2-4. When Eliminating Speed Lag between Original and Copy

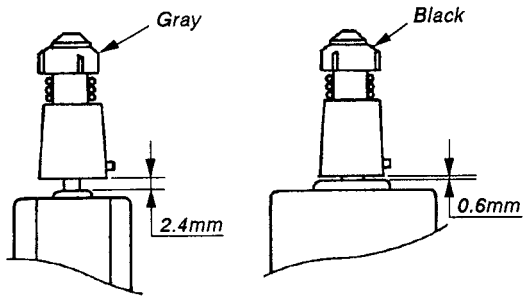
To make a tape without speed lag, the CCP-2310F must be modified since there is a 1% speed lag between original MD and copy MD in the CCP-2310F /2410F.

Modification is made by replacing the capstan (A) Assy used for original MD in the CCP-2310F with capstan (C) Assy.

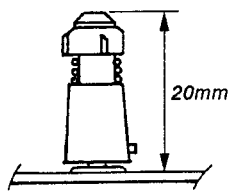
3-3. REEL HEAD ASSEMBLY POSITION

There are two methods available for replacing the reel head.

1) When reel head assembly is mounted on the stand alone motor (in case of motor change, etc.)
   Relative position between reel head and stand alone motor is A and B in Figure 3.



A : Reel head (L) Assy B : Reel head (R) Assy



C : Height from chassis

Figure 3

2) Positioning from chassis (if motor is attached to chassis)
   The distance from chassis to real head top is 20mm as shown Figure 3C.

Notes : 1. After replacement, confirm that the motor does not contact the reel head assembly.
2. Tighten the reel head assembly fixing screws (hex. socket head setscrew 2 × 3) with a hex. key wrench.
3. The left motor shaft is locally planed, and one of two setscrews should be positioned here.

3-4. ASSEMBLY OF CAPSTAN MOTOR AND MOTOR PULLEY

Insert slowly the motor pulley into the capstan motor shaft, and tighten hexagonal socket head screw where the pully is stopped.

Relative position between capstan motor and pulley is as shown in Figure 4.

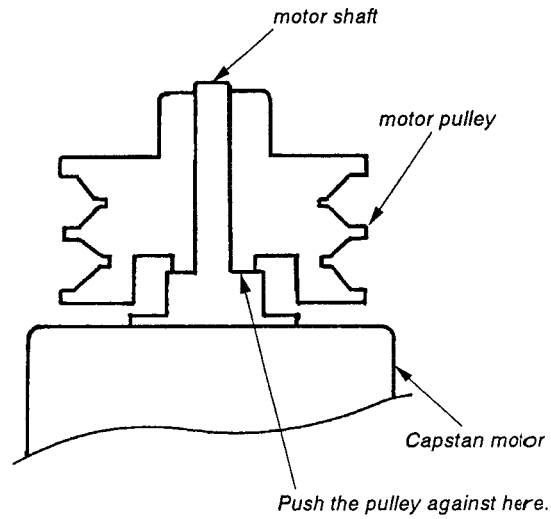
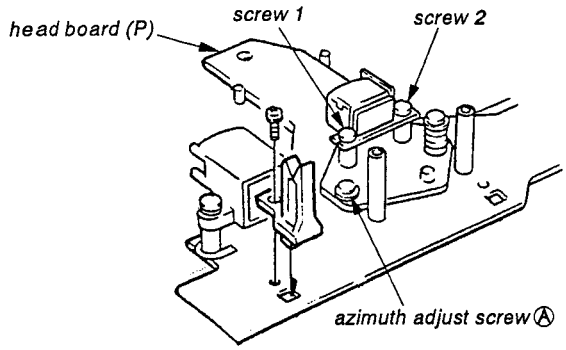


Figure 4

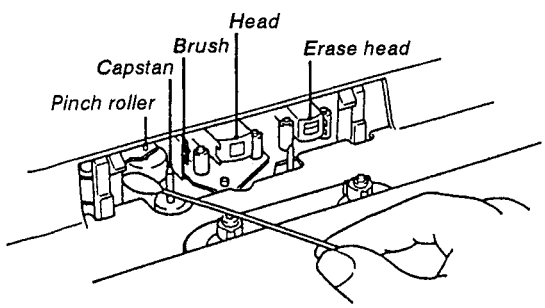
3-5. HEAD REPLACEMENT

1. Disconnect the lead wires of head at the solder part.
2. Remove the head fixing screws. (For screw 1, only loosen it.)
3. Install a new head with screws 1 and 2.
4. After installation, adjust height and azimuth of the head.



The set provides a cleaning mode and a service mode to facilitate the maintenance. Operate it in the procedure below.

3-6. CLEANING MODE



The head block will come out so that the head and pinch roller can easily be cleaned.

Operating method

CCP-2310F

Take out the cassette. Turn on the POWER switch while pressing the COPY button, and the head block will come out in about 4 seconds. The head block returns automatically after 5 munits, however, the cleaning mode cannot be reset unless other than COPY button is pressed.

CCP-2410F

Connect the CCP-2410F to the CCP-2310F, turn on the POWER switch with the CCP-2310F in the cleaning mode, and the cleaning mode is then activated.

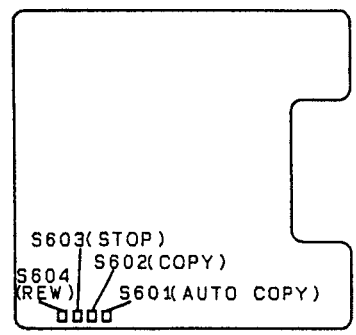
If the CCP-2410F alone is operated, turn on the POWER switch while pressing the COPY button (S602) inside the set, and the cleaning mode will be activated in about 4 seconds.(At this time, NEVER connect the CONTROL CABLE.)

After that, if the cleaning mode is reset by pressing other than COPY button, the CCP-2410F can be operated in the same manner as CCP-2310F by using the S601 – 604 switches.

However, the CCP-2410F cannot output signals to the transfer system.

For normal operation (linking with CCP-2310F), turn off the POWER switch once.

SY-3 BOARD COMPONENT SIDE



3-7. SERVICE MODE

This mode facilitates adjustment of reel motor speed and head azimuth.

Operating method

The CCP-2310F and CCP-2410F can be operated in the same method.

1) Turn on the POWER switch while pressing the REW and AUTO COPY buttons.
2) Keep pressing both buttons, and when the SHORT TAPE indicator goes off after about 4 seconds, release the AUTO COPY button. (At this time, do not release the REW button.)
3) Further after 2 seconds, make sure that the SHORT TAPE indicator comes on again and the service mode is activated, then release the REW button.

The following operation is available.

AUTO COPY : Same status as the COPY, with exception that the bias does not rise up. Accodingly, the azimuth can easily be checked when the record head is connected directly to the playback amplifier.

COPY : The COPY status is maintained, so that the take up reel and plunger circuits can be checked.

REW : The REWIND status is maintained, so that the supply reel circuit can be checked.

Note : In the COPY and REWIND modes, the shutoff and brake circuits do not function. Therefore, never insert a cassette. If a cassette is inserted, the real motor can be damaged at the end of tape.

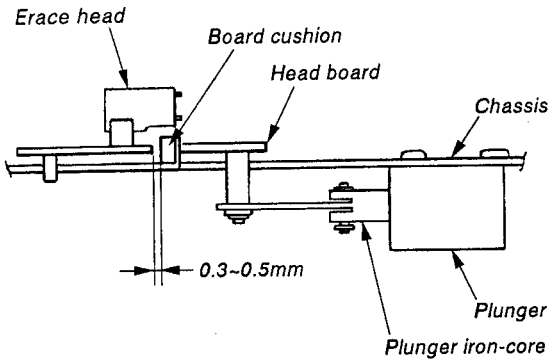
[Test tape]

Type	Part No.	Signal	
		Frequency (Hz)	Level (dB)
P-4-L300	7-819-011-11	315	0
P-4-A063	7-819-014-11	6.3 k	– 10
P-4-A100	7-819-016-11	10 k	– 10
WS-48A	7-819-032-11	3 k	0
CQ-012C	8-909-708-02	Mirror, 12 μ base	
CQ-201B	8-909-708-41	Torque	

SECTION 4
ALIGNMENT

4-1. ADJUSTMENT OF PLUNGER STROKE

The plunger stroke must be adjusted to determine the head advance amount, when the plunger is replaced.



Replacement and Adjustment :

1. Removing the cassette retainer (3-164-259-01) on the front side of chassis will expose the plunger fixing screws (PSW 3 × 6).
2. Replace the plunger, fix it temporarily to the chassis, and link it to the head board.
3. Push in the plunger iron-core until it contacts closely the plunger main body, so that the head board advances.
4. Fix the plunger at the position where a clearance between head board and board cushion (3-164-245-01) bonded to the notch in the chassis is 0.3 to 0.5 mm.

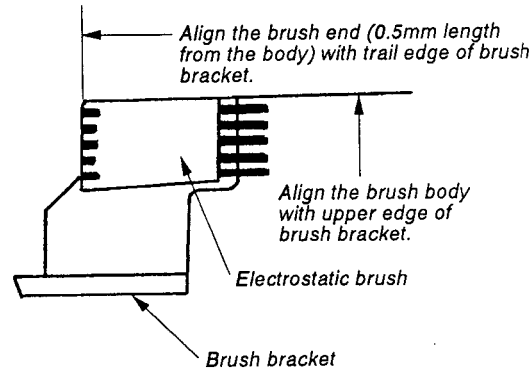
Note : After replacement, confirm in the copy satatus (service mode or cleaning mode) that the clearance of 0.3~0.5mm is ensured.

4-2. REPLACEMENT OF ELECTROSTATIC BRUSH

An electrostatic brush is attached to the head board to eliminate static discharge. It comes in contact with the tape when the head board advances. Therefore, it wears.

Follow the procedure provided below when replacing the brush.

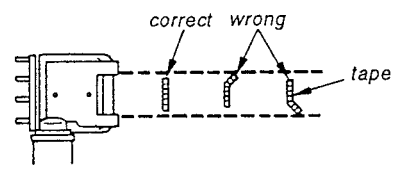
1) Remove the electrostatic brush assembly (PS 2 × 4) on the head board, then peel the brush off the brush bracket (3-164-234-02).
2) Clean the brush bracket with alcohol, and bond a new brush.
3) The electrostatic brush position is as shown in Figure.


Align the brush end (0.5mm length from the body) with trail edge of brush bracket.
Align the brush body with upper edge of brush bracket.
Electrostatic brush
Brush bracket

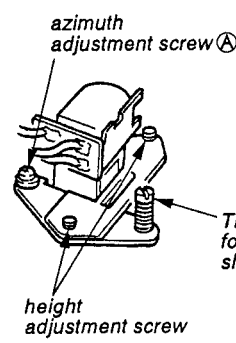
Note : The brushes are made of thin stainless wires. Take care not to bend them during replacement.

4-3. HEAD HEIGHT ADJUSTMENT

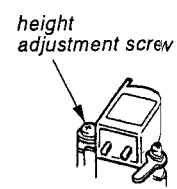
1. Install a mirror tape cassette (CQ-012C) and depress COPY button and STOP button alternately and watch the tape at tape guide.
2. In COPY mode, if tape is curled along tape guide, adjust the respective adjustment parts shown below.



Record and Playback Head :



Guide Head :



Note : Also pay attention to head azimuth and zenith, and execute visual confirmation.
For this, turn the front and back height adjustment screws and the vertical adjustment screw each for about the same amount.

4-4. HEAD AZIMUTH ADJUSTMENT

Select either of the following three methods.

A. When the playback amplifier (AU-198) in CCP-2310F is used.
B. There is no CCP-2310F.
C. When the level meter on the CCP-2310F is used.

Note : Don't press the COPY, REWIND button in service mode when insert the cassette tape. Using the Head demagnetizer, demagnetize the head and clean the pinch roller and head.

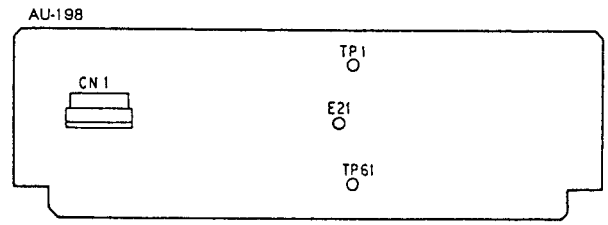
A. When the playback amplifier (AU-198) in CCP-2310F is used.

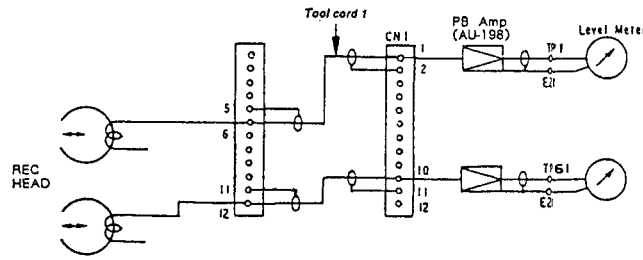
Test Equipment : Tool Cord 1
Test Tape (P-4-A100)
Level Meter
CCP-2310F

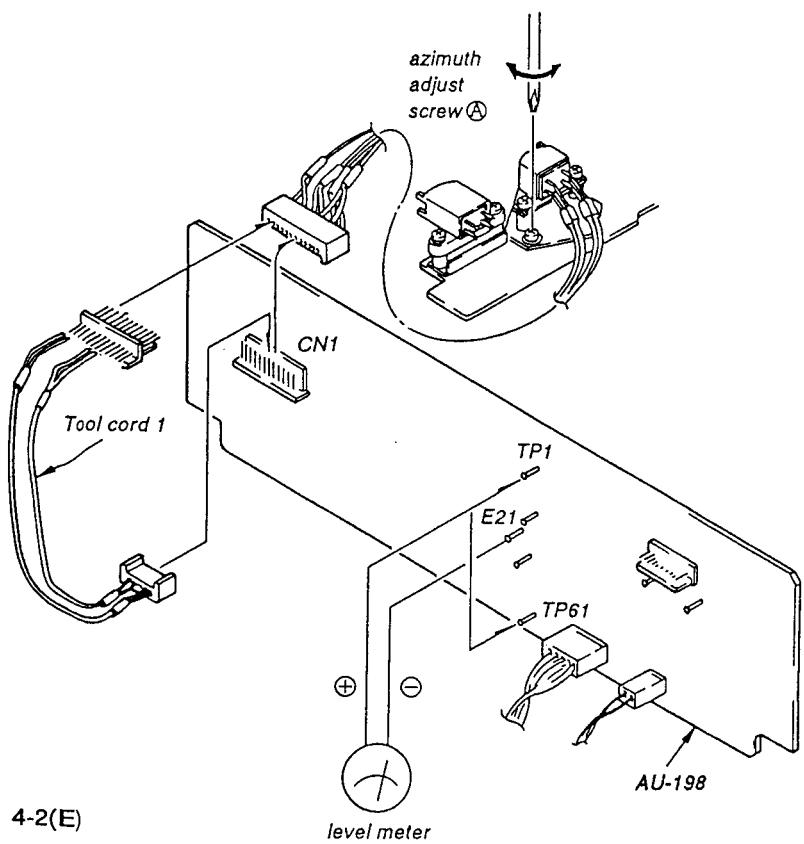
Procedure:

* 1. Disconnect the connector CN1 from the original head (playback) on the AU-198.
* 2. Connect the connector on the head to be adjusted to the tool cord 1, then connect another end to the connector CN1 on the AU-198 board.
3. Connect a "+" terminal of level meter to TP1 or TP61 on the AU-198 board, and "−" terminal of level meter to E21 on the AU-198 board.
4. Insert the test tape (P-4-A100) into the deck to be adjusted.
5. Activate the service mode, press the AUTO COPY button to activate the playback status. Refer to "3-7. SERVICE MODE" on page 3-5 (E).
6. Adjust the azimuth adjust screw Ⓐ so that reading of both level meters output level (TP1 and TP61) become the maximum.

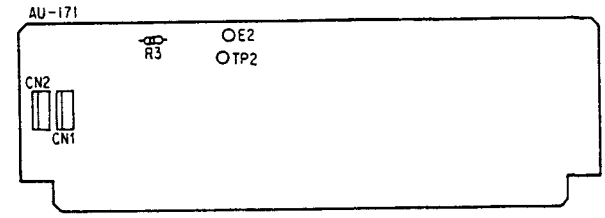
Note : The items marked * are not necessary for P. B. head adjustment.

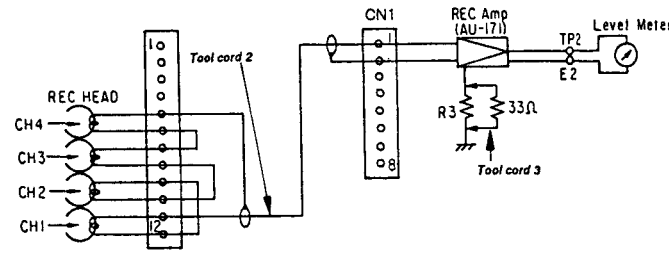






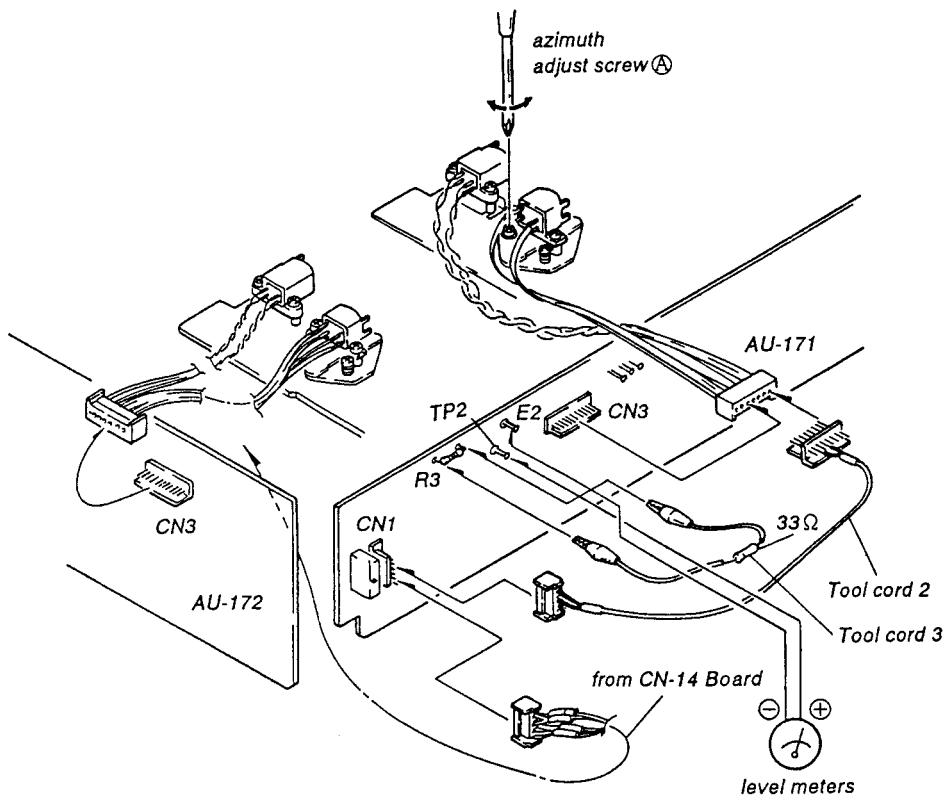
B. There is no CCP-2310F.
Test Equipment : Tool Cord 2
Tool Cord 3
Test Tape (P-4-A100)
Level Meter





Procedure:

1. Disconnect connectors on each head the AU-171 and AU-172 board.
2. Disconnect the connecting cable to CN1 on the AU-171 board from CN-14 board.
3. Connect the connector on the head to be adjusted to the tool cord 2, and connect another end to CN1 on the AU-171 board.
4. Connect each side of the tool cord 3 (resistance 33 Ω) to R3 in parallel.
5. Insert the test tape (P-4-A100) into the deck to be adjusted.
6. Connect a "+" terminal of level meter to TP2 on the AU-171 board, and "−" terminal of level meter to E21 on the AU-171 board.
7. Activate the service mode, press the AUTO COPY button to activate the playback status.
   Refer to "3-7. SERVICE MODE" on page 3-5 (E).
8. Adjust the azimuth adjust screw Ⓐ so that reading of level meters become the maximum.

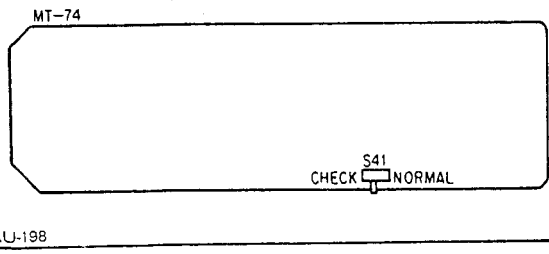


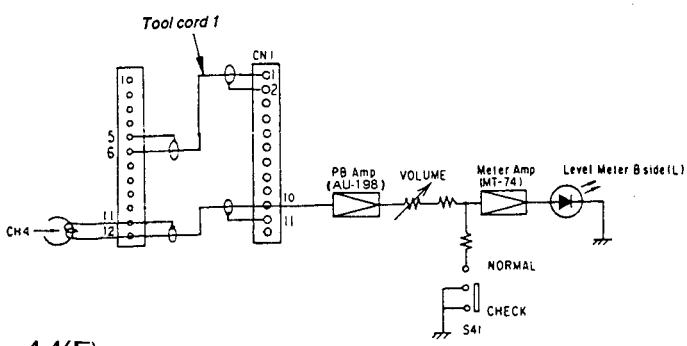
C. When the level meter on the CCP-2310F is used.
Test Equipment : Tool Cord 1
Test Tape (P-4-A100)
CCP-2310F (at record head of CCP-2410F adjustment)

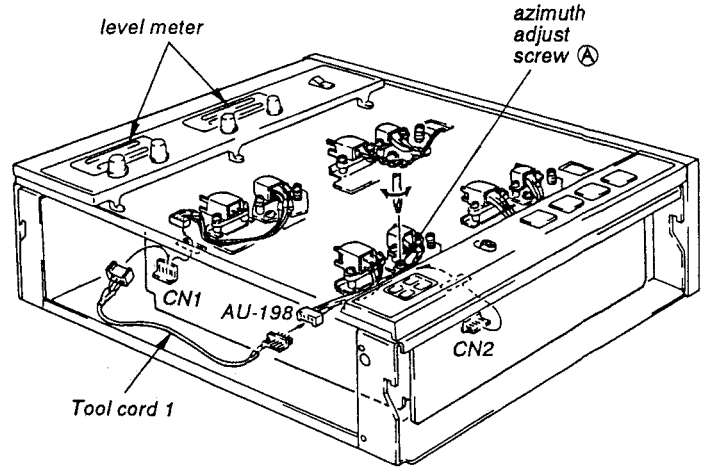
Procedure:

1. Change over the S41 on the meter board (MT-74) to CHECK side.
* 2. Disconnect the connector CN1 from the original head (playback) on the AU-198.
* 3. Connect the connector on the head to be adjusted to the tool cord 1, then connect another end to the connector CN1 on the AU-198 board.
4. Insert the test tape (P-4-A100) into the deck to be adjusted.
5. Activate the service mode, press the AUTO COPY button to activate the playback status. Refer to "3-7. SERVICE MODE" on page 3-5 (E).
6. Adjust the azimuth adjust screw Ⓐ so that reading of left level meters at B side become the maximum.
(Since fine adjustment is posible where the level meter is around 0dB, rotate to azimuth adjust screw Ⓐ while adjusting the VOLUME so that the playback level of 10kHz is about 0dB.)
7. After adjustment, return the S41 on the meter board (MT-74) from CHECK side to NORMAL side with the S41 in CHECK position, the level is raised by about 20dB so that a weak signal from the head can be indicated on the meter.

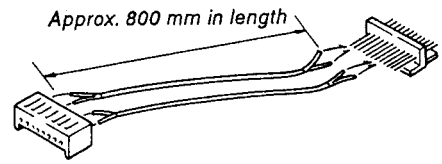
Note : The items marked * are not necessary for P. B. head adjustment.

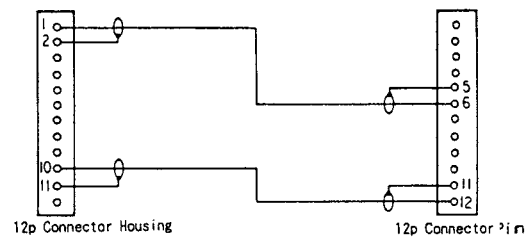




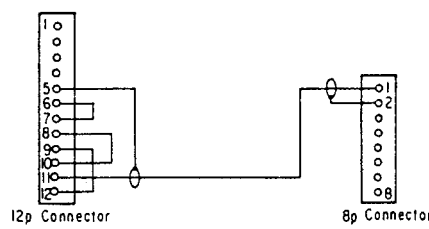


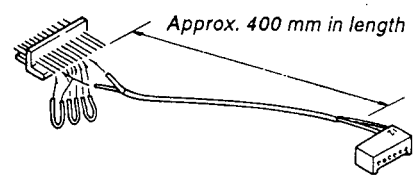
How to making tool cord 1



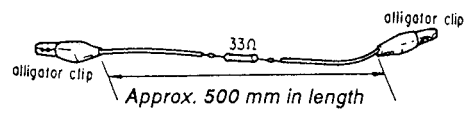


How to making tool cord 2





How to making tool cord 3



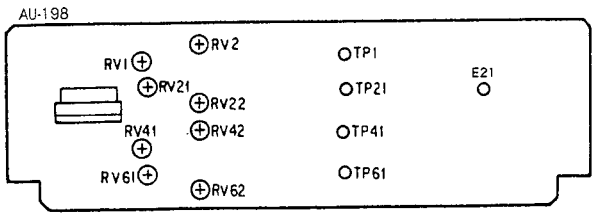
4-5. ADJUSTMENT OF PLAYBACK LEVEL (CCP-2310F ONLY)

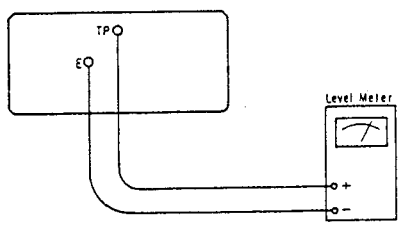
Test Equipment : Demagnetizer
Level Meter
Test Tape (P-4-L300)

Procedure:

1. Using the head demagnetizer, demagnetize the head and clean the pinch roller and head.
2. Set the playback level controls (RV1, RV21, RV41 and RV61 on the MT-74 board) to the center.
3. Turn the power switch ON.
4. Set the SIDE selector to "A + B".
5. Insert the test tape (P-4-L300) on the original side.
6. Press the COPY button, then connect the terminal of level meter to following each test point on the AU-198 board. Adjust the RV associated with each test point so that the output become 0dB ±0.5dB.

Board	CH	Level Meter Connection		Adjust
		+ Terminal	− Terminal	
AU-198	CH1	TP1	E21	RV1
	CH2	TP21	E21	RV21
	CH3	TP41	E21	RV41
	CH4	TP61	E21	RV61





4-6. ADJUSTMENT OF FREQUENCY CHARACTERISTICS (CCP-2310F ONLY)

Test Equipment Level Meter
Test Tape P-4-L300
P-4-A063
P-4-A100

Note: Before this adjustment, adjustment of playback level must has been finished.

Procedure:

(315Hz)

1. Insert the test tape (P-4-L300) on the original side, then press the COPY button and measure the playback output level.

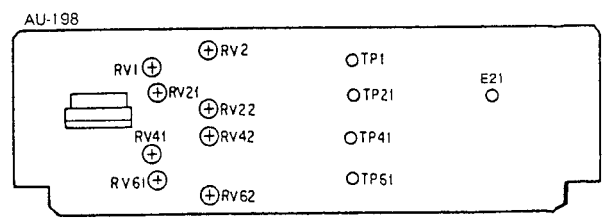
(6.3kHz)

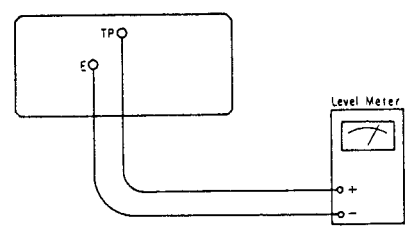
2. Insert the test tape (P-4-A063) on the original side, then press the COPY button and measure the playback output level.

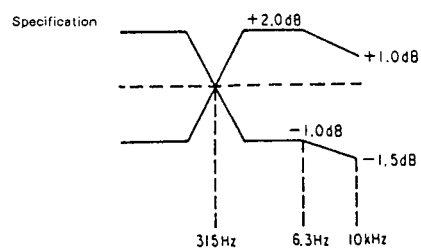
(10kHz)

3. Insert the test tape (P-4-A100) on the original side, then press the COPY button and measure the playback output level.
4. If the playback output level is out of specification, and adjust the RV (on the AU-198 board) associated with each test point.

Board	CH	Level Meter Connection		Adjust	
		+ Terminal	− Terminal	6.3kHz	10kHz
AU-198	CH1	TP1	E21	RV2	RV1
	CH2	TP21	E21	RV22	RV21
	CH3	TP41	E21	RV42	RV41
	CH4	TP61	E21	RV62	RV61







4-7. BIAS FREQUENCY ADJUSTMENT (CCP-2310F/2410F)

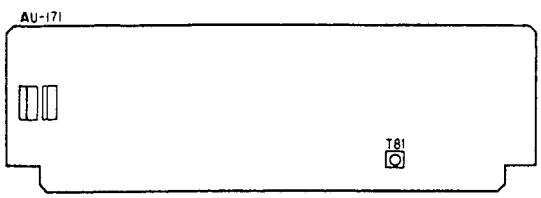
Test Equipment : Level Meter
Frequency Counter
Coil 10mH

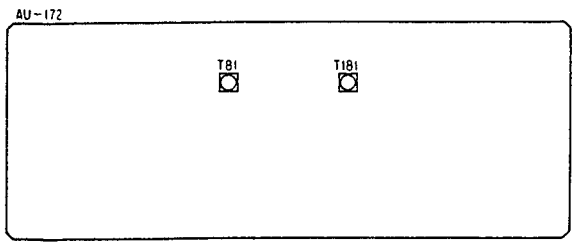
Adjustment Point : T81 : AU-171 board
T81, T181 : AU-172 board

1. Connect the coil to the frequency counter.
2. Set the SIDE selector on the CCP-2310F to "A + B". In the case of CCP-2410F adjustment, the SIDE selector has already been in "A + B" status.
3. Activate the service mode, in the case of CCP-2410F adjustment, the service mode is activated by operating the switch on the SY-3 board indside the set.
(DO NOT INSERT A CASSETTE. ⇨P3-5 (E))
4. Press the COPY button, and after 30 seconds, bring the coil closely to the erase head, then adjust the following bias transformers (on the AU-171 and AU-172 board) so that the bias frequency is in specification.

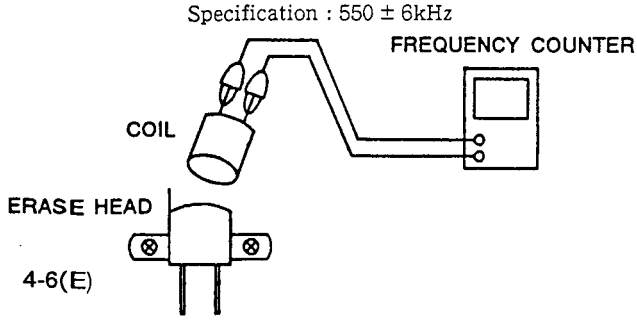
Note : Adjust the bias frequency equally on the AU-172 board. (There is a possibility that the difference of the bias frequency generates the beat noise.)

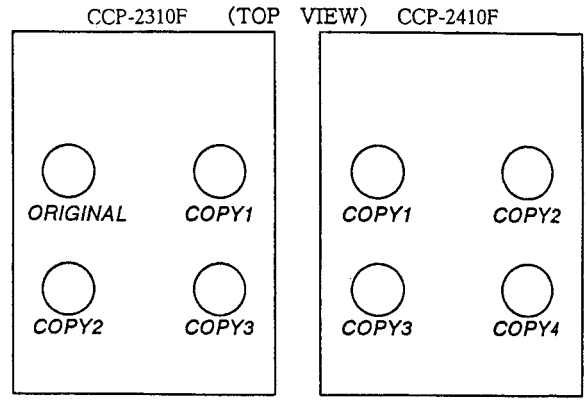
MODEL	BOARD	BIAS TRANSFER	COPY
CCP-2310F	AU-171	T81	COPY 1
	AU-172	T81	COPY 2
		T181	COPY 3
CCP-2410F	AU-171 (LEFT)	T81	COPY 1
	AU-171 (RIGHT)	T81	COPY 2
	AU-172	T81	COPY 3
		T181	COPY 4





Specification : 550 ± 6kHz





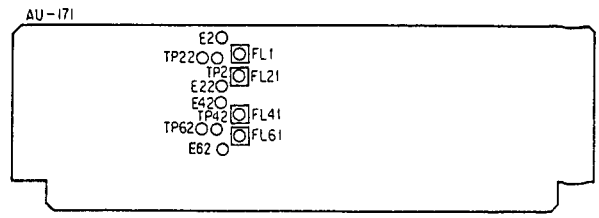
4-8. BIAS TRAP ADJUSTMENT (CCP-2310F/2410F)

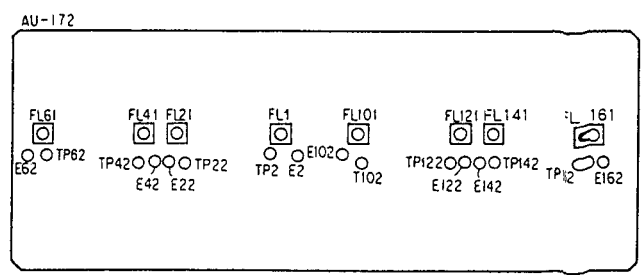
Test Equipment : Level Meter

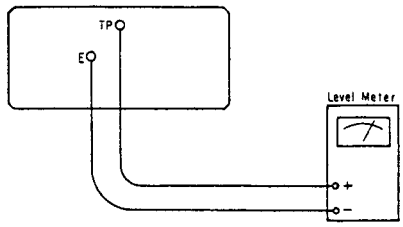
Procedure:

1. Set the SIDE selector on the CCP-2310F to "A + B". In the case of CCP-2410F adjustment, the SIDE selector has already been in "A + B" status.
2. Activate servcie mode is activated by operating to switch on the SY-3 board inside the set.
(DO NOT INSERT A CASSETTE. ⇨P3-5 (E))
3. Press the COPY button, then connect the terminal of level meter to following each test point on the AU-171 and AU-172 board. And adjust the bias trap associated with the test point so that the output become the minimum.

Board	CCP-2310F	CCP-2410F	CH	Level Meter Connection		Adjust
				+Terminal	-Terminal	
AU-171	COPY 1	COPY 1, 2	CH1	TP2	E2	FL1
			CH2	TP22	E22	FL21
			CH3	TP42	E42	FL41
			CH4	TP62	E62	FL61
AU-172	COPY 2	COPY 3	CH1	TP2	E2	FL1
			CH2	TP22	E22	FL21
			CH3	TP42	E42	FL41
			CH4	TP62	E62	FL61
	COPY 3	COPY 4	CH1	TP102	E102	FL101
			CH2	TP122	E122	FL121
			CH3	TP142	E142	FL141
			CH4	TP162	E162	FL161







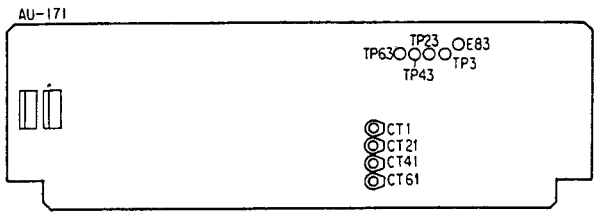
4-9. BIAS CURRENT PRE-ADJUSTMENT (CCP-2310F/2410F)

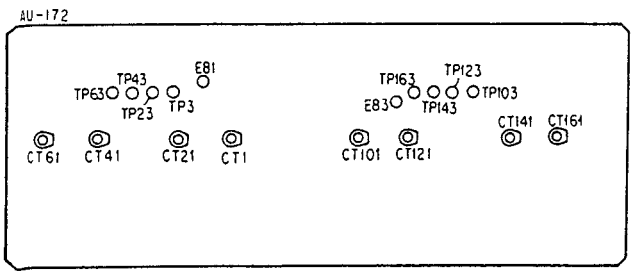
Test Equipment : Voltmeter

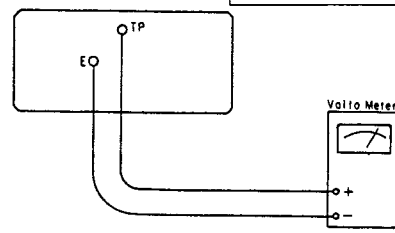
Procedure:

1. Active the service mode. In the case of CCP-2410F adjustment, the service mode is activated by operating the switch on the SY-3 board inside the set.
   (DO NOT INSERT A CASSETTE. ⇨P3-5 (E))
2. Press the COPY button, connect the voltmeter to the following test points on the AU-171 and AU-172 board, and adjust the trimmer capacitor associated with the test point so that the output become 20 ± 3mV.

Board	CCP-2310F	CCP-2410F	CH	Level Meter Connection		Adjust
				+Terminal	-Terminal	
AU-171	COPY 1	COPY 1, 2	CH1	TP3	E83	CT1
			CH2	TP23	E83	CT21
			CH3	TP43	E83	CT41
			CH4	TP63	E83	CT61
AU-172	COPY 2	COPY 3	CH1	TP3	E81	CT1
			CH2	TP23	E81	CT21
			CH3	TP43	E81	CT41
			CH4	TP63	E81	CT61
	COPY 3	COPY 4	CH1	TP103	E83	CT101
			CH2	TP123	E83	CT121
			CH3	TP143	E83	CT141
			CH4	TP163	E83	CT161







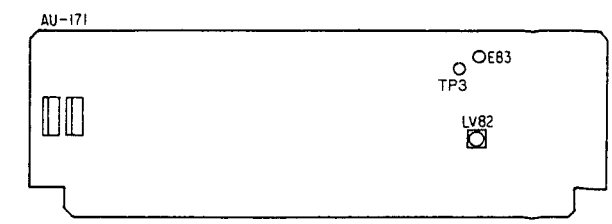
4-10. ADJUSTMENT OF ERASE HEAD DUMMY COIL (CCP-2310F/2410F)

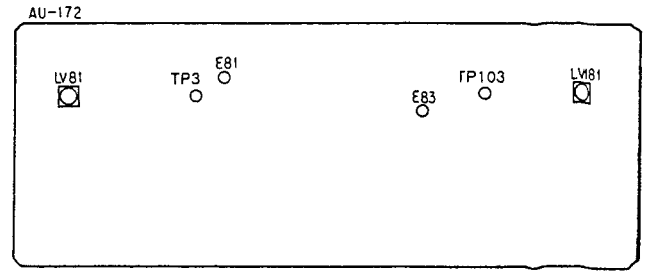
Test Equipment : Voltmeter

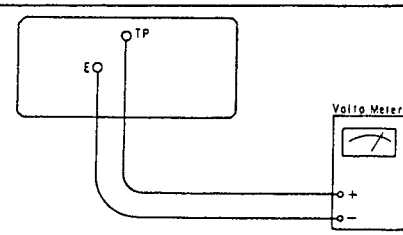
Procedure:

1. Set the SIDE selector on the CCP-2310F to "A + B". In the case of CCP-2410F adjustment, the SIDE selector has already in "A + B" status.
2. Activate the service mode is activated by operating the switch on the SY-3 board inside the set.
   (DO NOT INSERT A CASSETTE. ⇨P3-5 (E))
3. Press the COPY button, Connect the terminal of voltmeter to each test point on the AU-171 and AU-172 board the measure voltage.
4. Next, set the SIDE selector to "A", and measure voltage at following test points associated with each COPY. Then, adjust the dummy coil so that difference between the measure voltage and the when the SIDE selector was in "A + B" status is within 3mV in the range.
   In the case of CCP-2410F adjustment, grounding the test point E83 on AU-172 board place the SIDE selector in the status "A". (Or status "A + B" if not grounding.)

Board	CCP-2310F	CCP-2410F	Level Meter Connection		Adjust
			+ Terminal	- Terminal	
AU-171	COPY 1	COPY 1, 2	TP3	E83	LV82
AU-172	COPY 2	COPY 3	TP3	E81	LV81
	COPY 3	COPY 4	TP103	E83	LV181







4-11. ADJUSTMENT OF RECORD LEVEL AND FREQUENCY CHARACTERISTICS (CCP-2310F/2410F)

Before this adjustment, the bias current pre-adjustment must has been finished.

Test Equipment : Oscillator
Level Meter
Standard Cassette Player
Blank tape (60-minute)

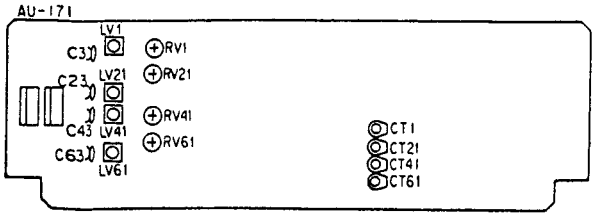
Procedure:

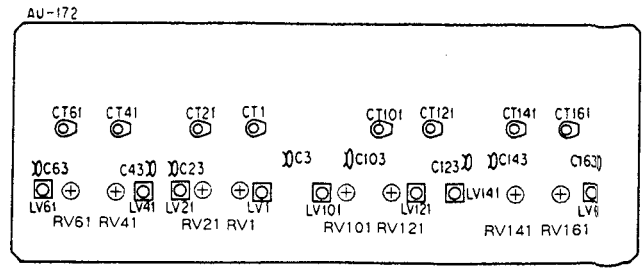
(Record level)

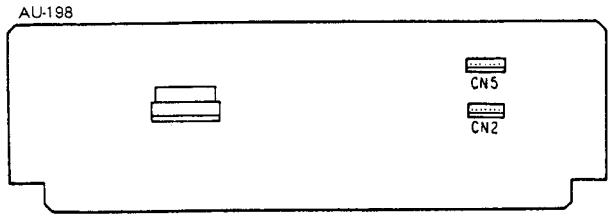
1. Disconnect the connector CN2 on the AU-198 board in the CCP-2310F and connect the CN5 instead.
2. Set the SIDE selector on the CCP-2310F to the "A + B".
3. Turn the POWER switch ON.
4. Insert a 60-minute tape to the ORIGINAL side of CCP-2310F and, blank tape for measurement to each COPY side.
5. Connect a "+" terminal of oscillator to TP2 on the AU-198 board and a "−" terminal of oscillator to E2 on the AU-198 board.
   Then press the COPY button while entering the 0dB 5kHz signal.
6. After copy, playback the copied tape with a standard cassette player and adjust each RV (on the AU-171 and AU-172 board) for record level adjustment so that the level is 0dB ± 1dB at 315Hz.
7. Next, SIDE selector to "A" and repeat step 5, 6. (Record frequency characteristics)
8. With the oscillator connection maintainned, press the COPY button while entering the following signals.
   − 20dB 5kHz
   − 20dB 100.8kHz
   − 20dB 160kHz
9. Then, playback the copied tape with a standard cassette player, and repeat adjustment and replacement of adjust capacitor, coil and trimmer capacitor (on the AU-171 and AU-172 board) so that the level is each frequency satisfies the specification.

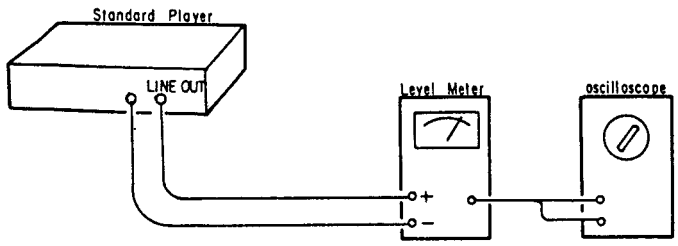
Note : Standard cassette player
High quality and finished adjustment cassette player.

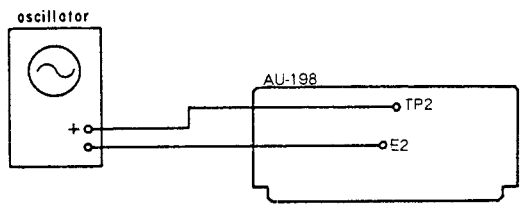
Board	CCP-2310F	CCP-2410F	CH	ADJUST POINT			
				LEVEL	FREQUENCY		
					6.3kHz	10kHz	10kHz to 6.3kHz
AU-171	COPY 1	COPY 1 COPY 2	CH1	RV1	C3	LV1	CT1
			CH2	RV21	C23	LV21	CT21
			CH3	RV41	C43	LV41	CT41
			CH4	RV61	C63	LV61	CT61
AU-172	COPY 2	COPY 3	CH1	RV1	C3	LV1	CT1
			CH2	RV21	C23	LV21	CT21
			CH3	RV41	C43	LV41	CT41
			CH4	RV61	C63	LV61	CT61
	COPY 3	COPY 4	CH1	RV101	C103	LV101	CT101
			CH2	RV121	C123	LV121	CT121
			CH3	RV141	C143	LV141	CT141
			CH4	RV161	C163	LV161	CT161



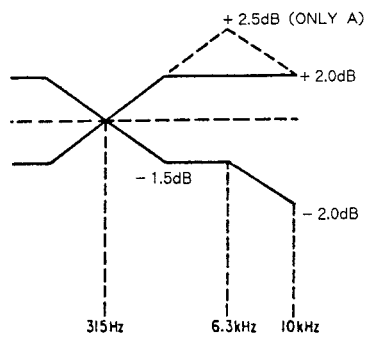








Specification



SECTION 5
SEMICONDUCTOR PIN ASSIGNMENTS

ここに記載されているIC, トランジスタ, ダイオードは, それぞれの機能を等価的に表わしたものです。したがって互換性を表わすものではありません。(互換性のない型名が併記されている事もあります。) 部品の交換をする時は, ELECTRICAL PARTS LISTの章を参照して下さい。

ICs, transistors and diodes whoses functions are equivalent are described here, Threfore, incompatible device names may be described together. For parts replacement, refer to the Electrical Parts List section in this manual.

DIODE	PAGE
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1SS119	5-2
GL112F9	5-2
RD6.2EL1	5-2
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2SC2603	5-2
2SC2785	5-2
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2SD998	5-2
DTA114ES	5-2
DTC114ES	5-2

IC	PAGE
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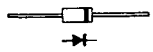
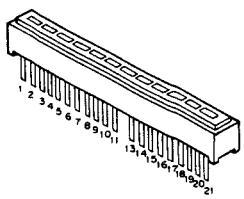
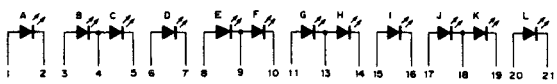
NE5532P	5-3
NJM7805FA	5-3
NJM7912FA	5-3
PST520C	5-3
TA7812S	5-3
UPC4556C	5-3
M50747SP-C42SP	5-3

10E-2
11ES1
1SS119

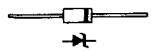


GL112F9 ; YELLOW GREEN (AtoG), RED (HtoL)

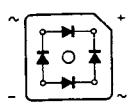




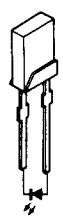
RD6.2EL1
RD6.2EL2



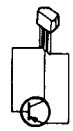
S5VB20
S5VB60



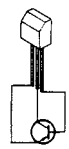
SEL1121R ; RED
SEL1321G ; GREEN



2SA1317



2SB733



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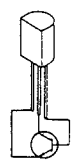

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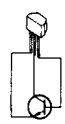
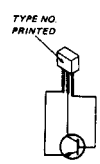
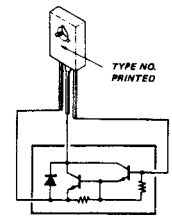


2SC2785

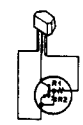


2SD774

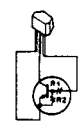
2SD998



DTA114ES (R1 = 10K, R2 = 10K)

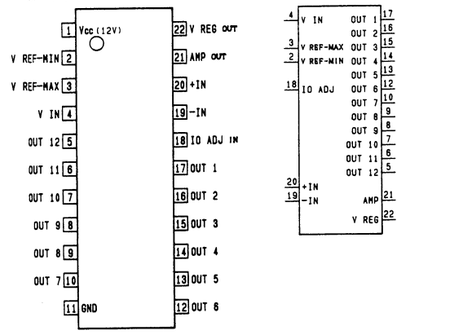


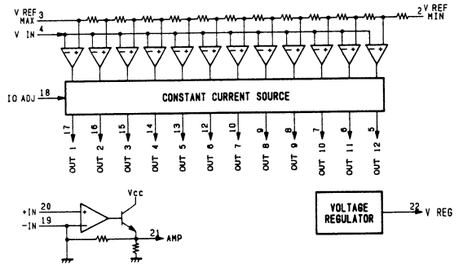
DTC114ES (R1 = 10K, R2 = 10K)



IR2E30 (SHARP)

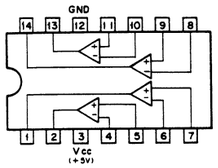
12-DOT LED DISPLAY DRIVER
- TOP VIEW -





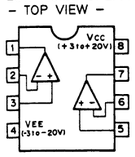
LM339N (TI)

QUAD COMPARATORS
- TOP VIEW -



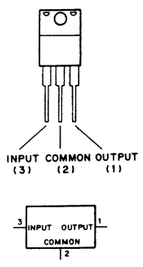
NE5532P (TI)

LOW NOISE OPERATIONAL AMPLIFIER
- TOP VIEW -



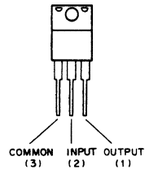
NJM7805FA (JRC) + 5V

POSITIVE VOLTAGE REGULATOR (500mA)
- FRONT VIEW -



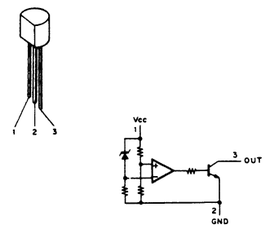
NJM7912FA (JRC) - 12V

NEGATIVE VOLTAGE REGULATOR (500mA)
- FRONT VIEW -



PST520C (MITSUMI) 4.5V

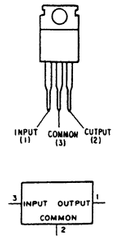
SYSTEM RESETTING DEVICE



REF.; REFERENCE VOLTAGE

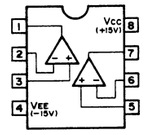
TA7812S (TOSHIBA) + 12V

POSITIVE VOLTAGE REGULATOR (0.5A)
- SIDE VIEW -



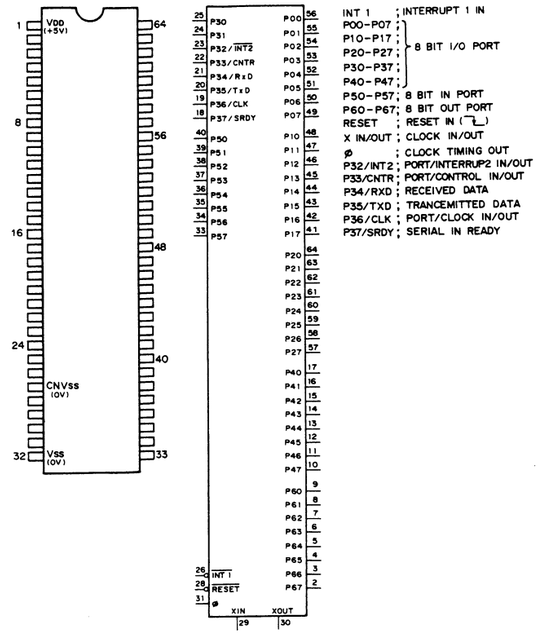
UPC4556C (NEC)

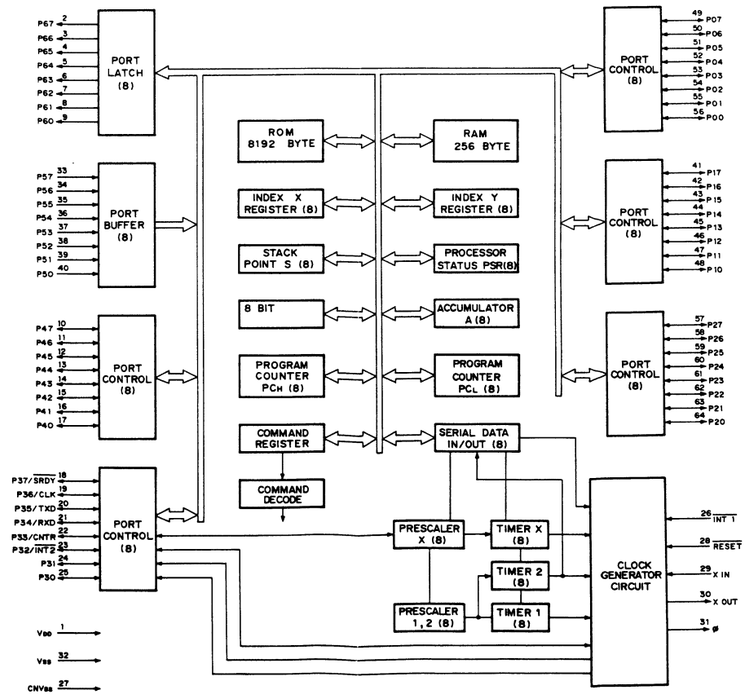
OPERATIONAL AMPLIFIER
(WIDE BAND, DECOMPENSATED)
- TOP VIEW -



M5074SP-C42SP (FUJITSU)

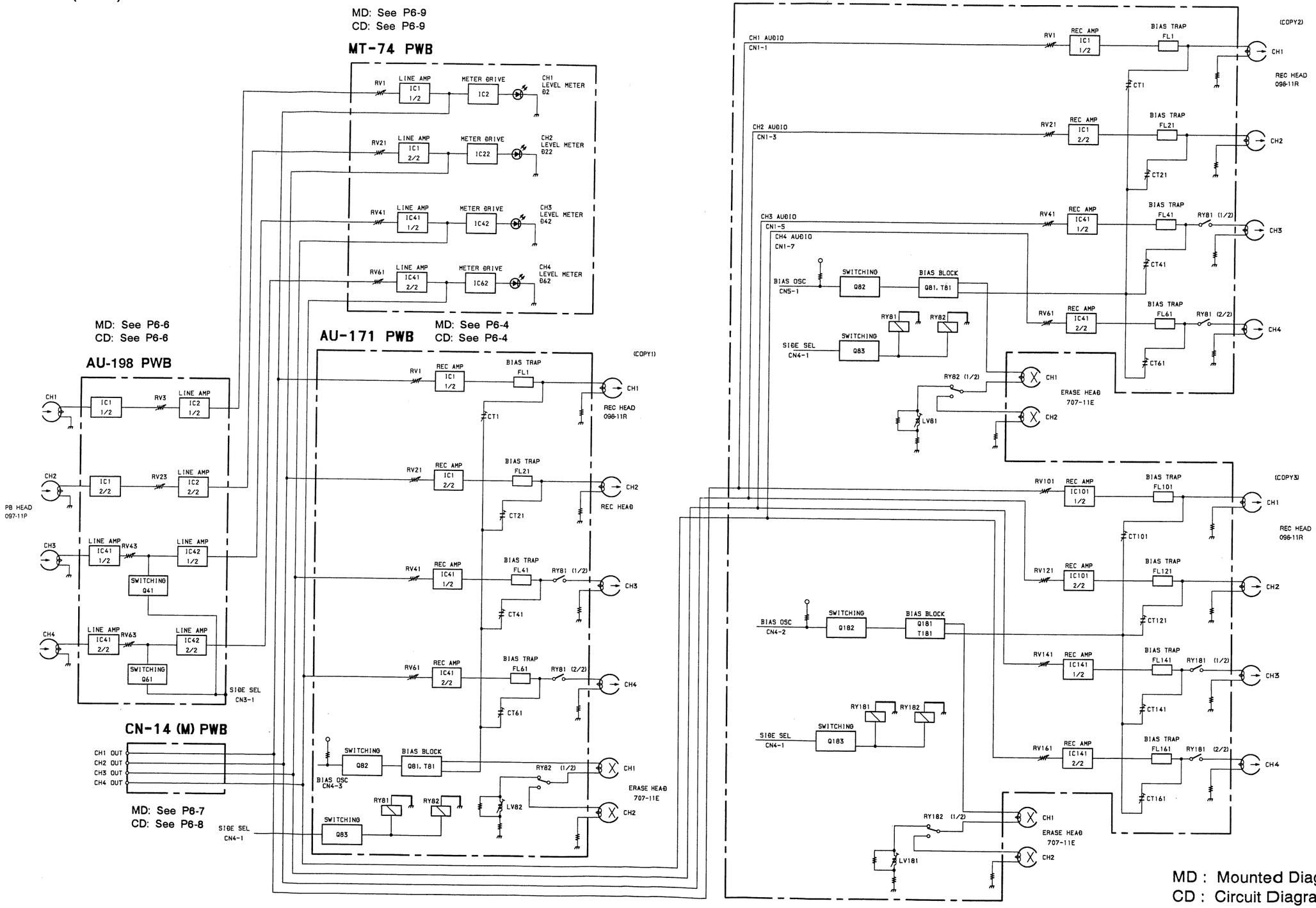
C-MOS PROCESS 8-BIT ONE CHIP MICROCOMPUTER
- TOP VIEW -





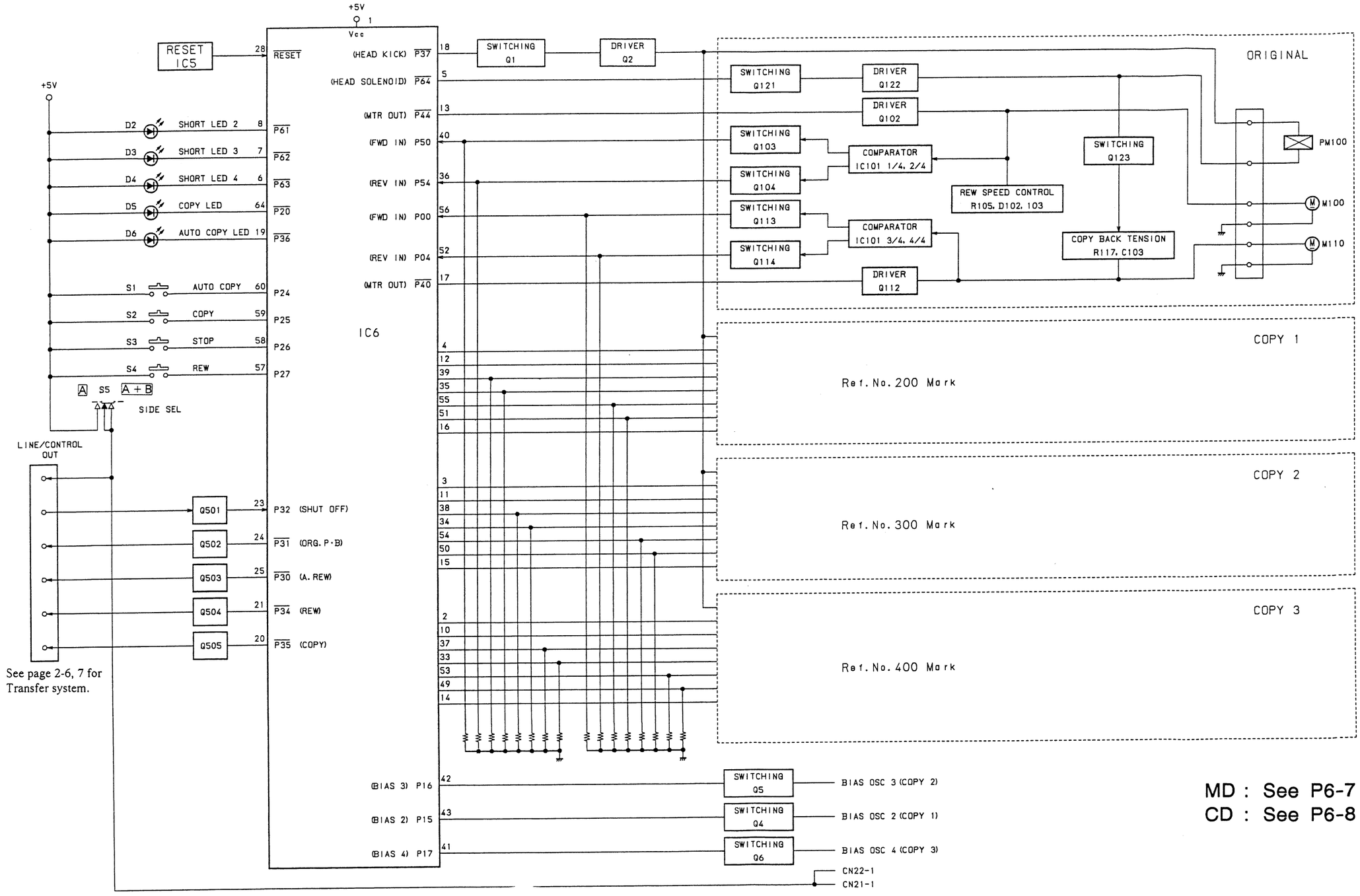
SECTION 6
CCP-2310F DIAGRAMS

6-1. BLOCK DIAGRAM (AUDIO)



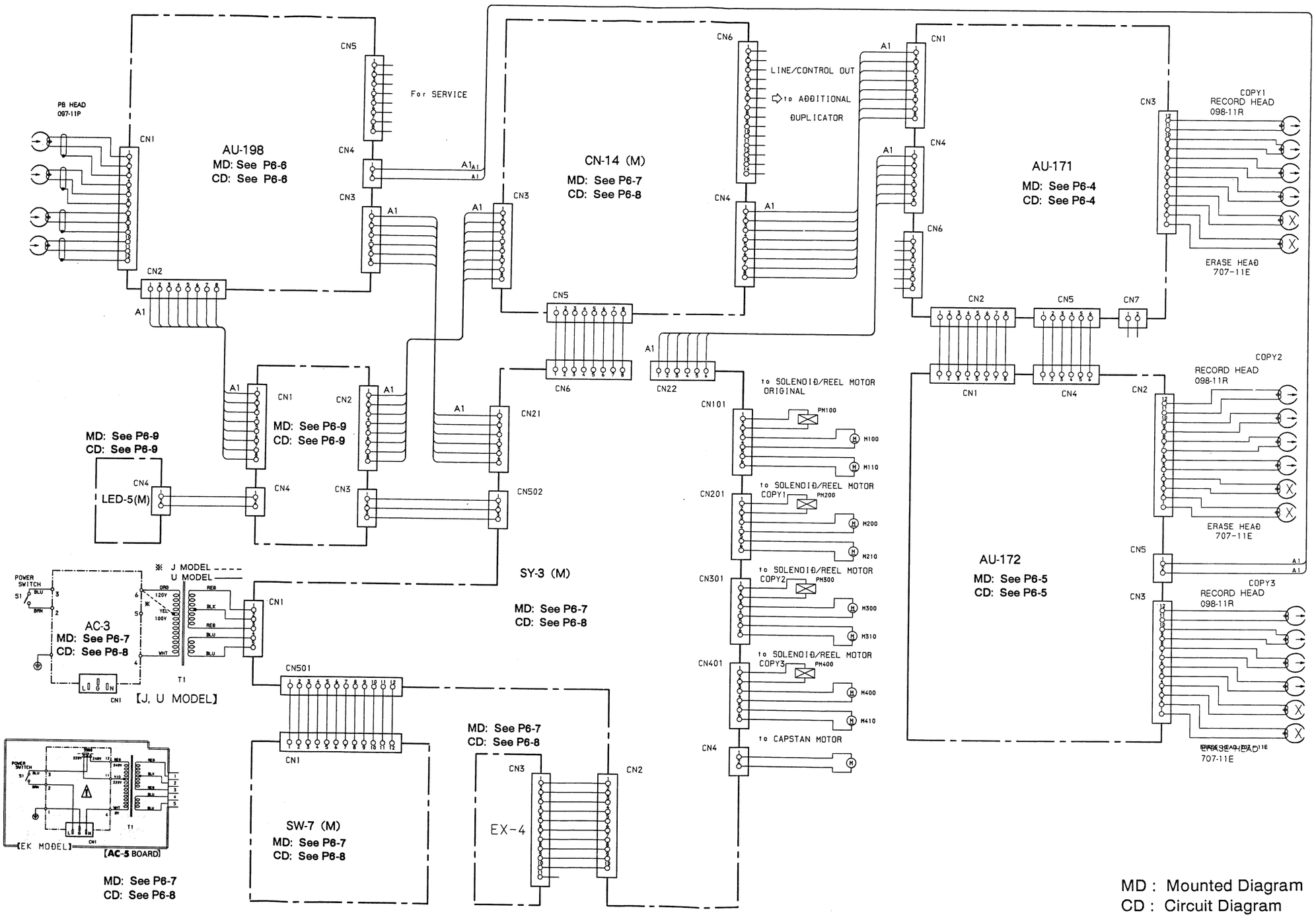
MD : Mounted Diagram
CD : Circuit Diagram

6-2. BLOCK DIAGRAM (SYSTEM)



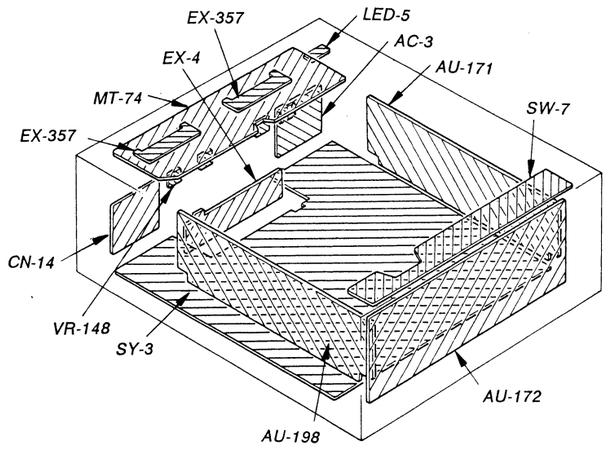
MD : See P6-7
CD : See P6-8

6-3. FRAME WIRING

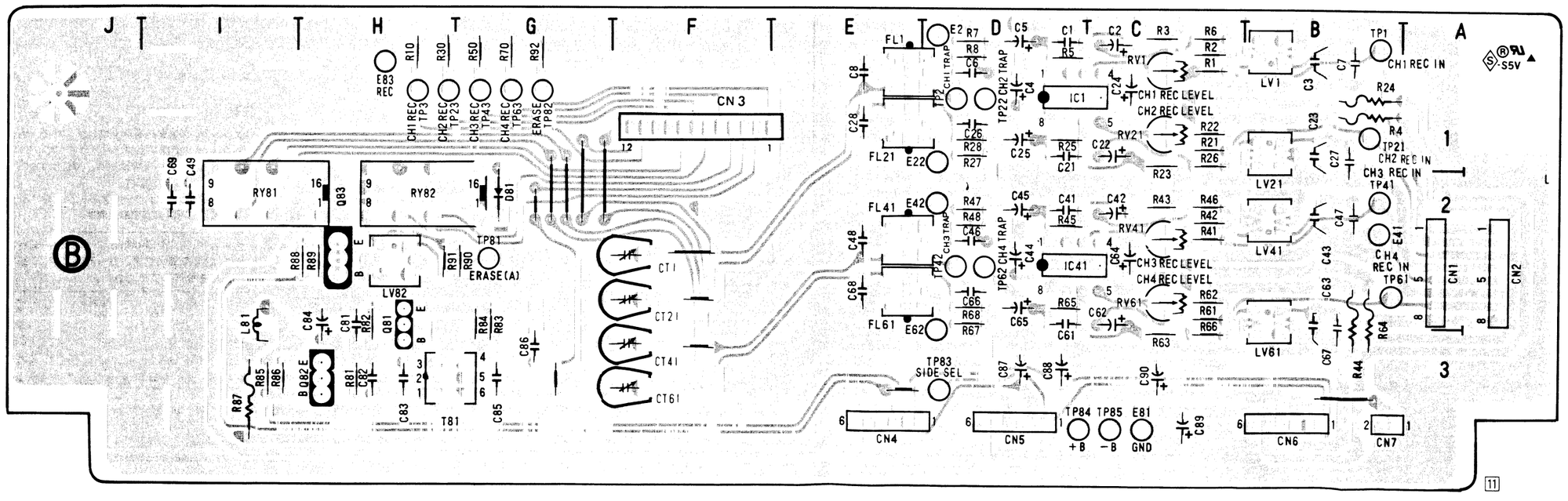


MD : Mounted Diagram
CD : Circuit Diagram

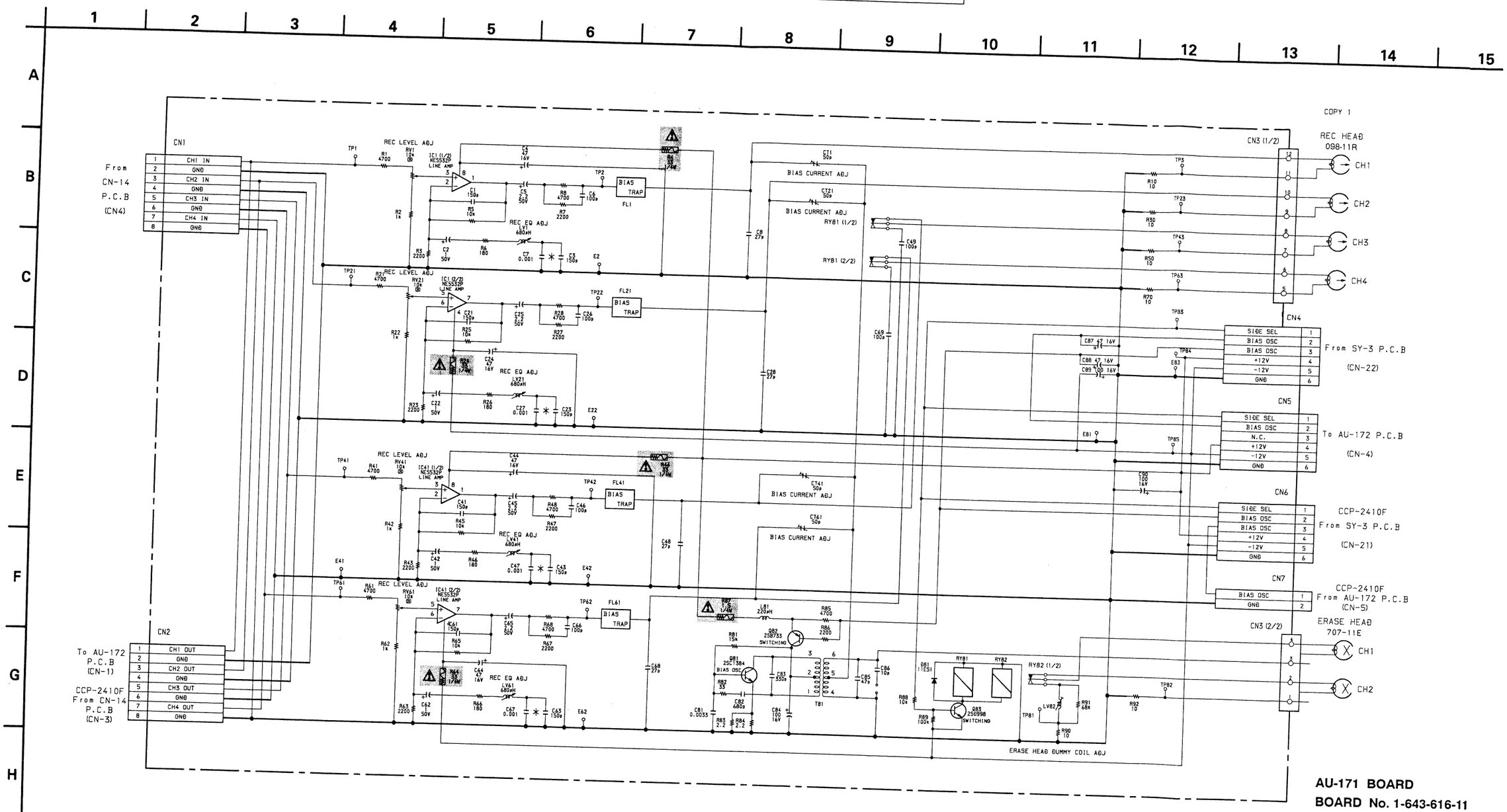
6-4. LOCATION OF THE PRINTED WIRING BOARD



6-5. AU-171 BOARD – *Soldering Side* –



AU-171 BOARD
BOARD No. 1-643-616-11



AU-171 BOARD
BOARD No. 1-643-616-11

注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ⚠はヒューズ抵抗。
- ＊印部品は可変の調整部品です。

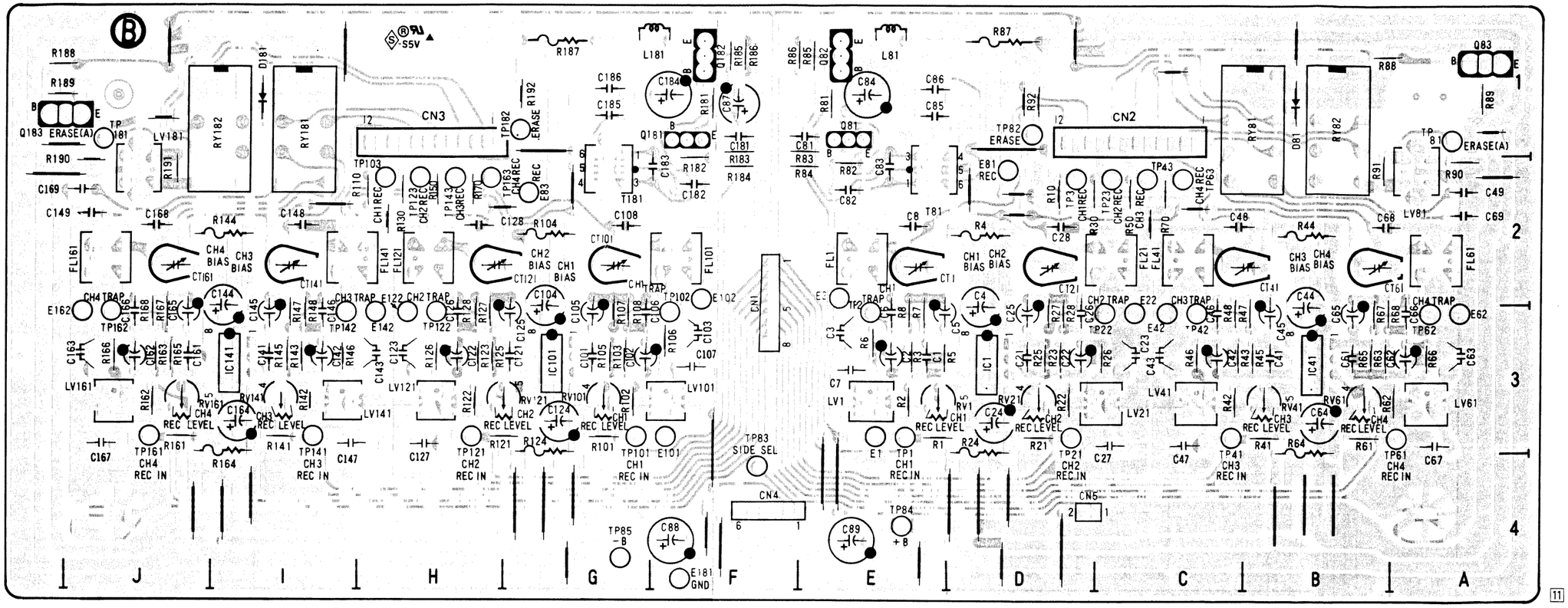
⚠および　　印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⚠ : fusible resistor.
- " ＊ " mark parts are adjustment parts they have varied value.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

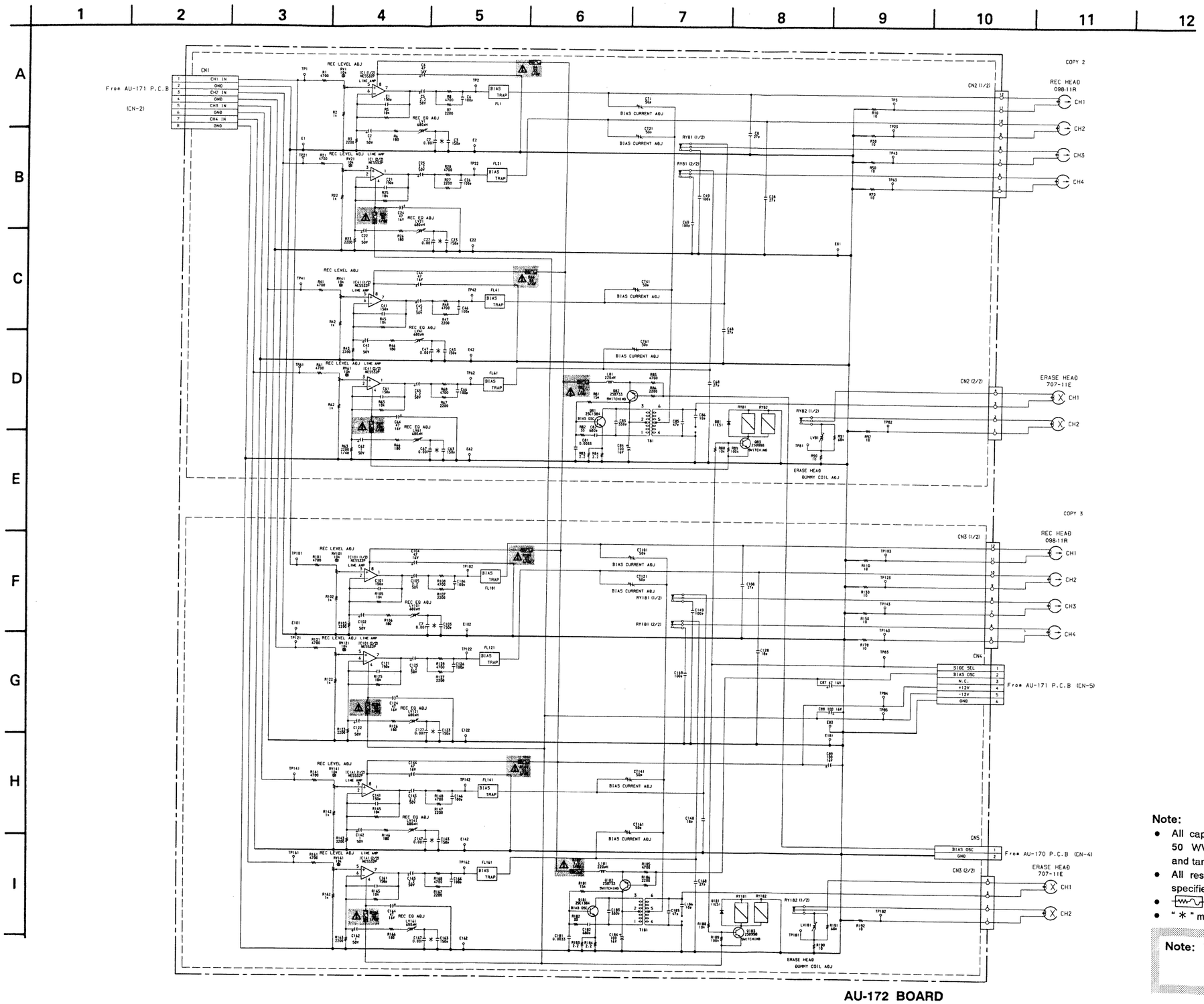
6-6. AU-172 BOARD – *Soldering Side* –



AU-172

CN1	F-3	E81	D-2	LV1	E-3	R104	G-2	TP43	C-2
CN2	C-1	E83	G-2	LV21	C-3	R124	G-3	TP61	A-3
CN3	H-1	E101	F-3	LV41	C-3	R144	I-2	TP62	A-3
CN4	F-4	E102	F-3	LV61	A-3	R164	I-4	TP63	C-2
CN5	D-4	E122	H-3	LV81	A-2	R187	G-1	TP81	A-1
		E142	H-3	LV101	F-3			TP82	D-1
CT1	E-2	E162	J-3	LV121	H-3	RV1	D-3	TP83	F-4
CT21	D-2	E181	F-4	LV141	H-3	RV21	D-3	TP84	E-4
CT41	B-2			LV161	J-3	RV41	B-3	TP85	G-4
CT61	B-2	FL1	E-2	LV181	J-1	RV61	B-3	TP101	G-3
CT101	G-2	FL21	C-2			RV101	G-3	TP102	F-3
CT121	G-2	FL41	C-2	Q81	E-1	RV121	G-3	TP103	H-2
CT141	I-2	FL61	A-2	Q82	E-1	RV141	I-3	TP121	H-3
CT161	J-2	FL101	F-2	Q83	A-1	RV161	J-3	TP122	H-3
		FL121	H-2	Q181	F-1			TP123	H-2
D81	B-1	FL141	H-2	Q182	F-1	TP1	E-3	TP141	I-3
D181	I-1	FL161	J-2	Q183	J-1	TP2	E-3	TP142	I-3
						TP3	D-2	TP143	H-2
E1	E-3	IC1	D-3	R4	D-2	TP21	D-3	TP161	J-3
E2	E-2	IC41	B-3	R24	D-3	TP22	C-3	TP162	J-3
E22	C-3	IC101	G-3	R44	B-2	TP23	C-2	TP163	H-2
E42	C-3	IC141	I-3	R64	B-3	TP41	C-3	TP181	J-1
E62	A-3			R87	D-1	TP42	C-3	TP182	G-1

AU-172 BOARD
BOARD No. 1-643-617-11



AU-172 BOARD

6-5 **BOARD No. 1-643-617-11**

注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ⏦はヒューズ抵抗。
- C1, 21, 41, 61はノーマウント。
- ＊印部品は可変の調整部品です。

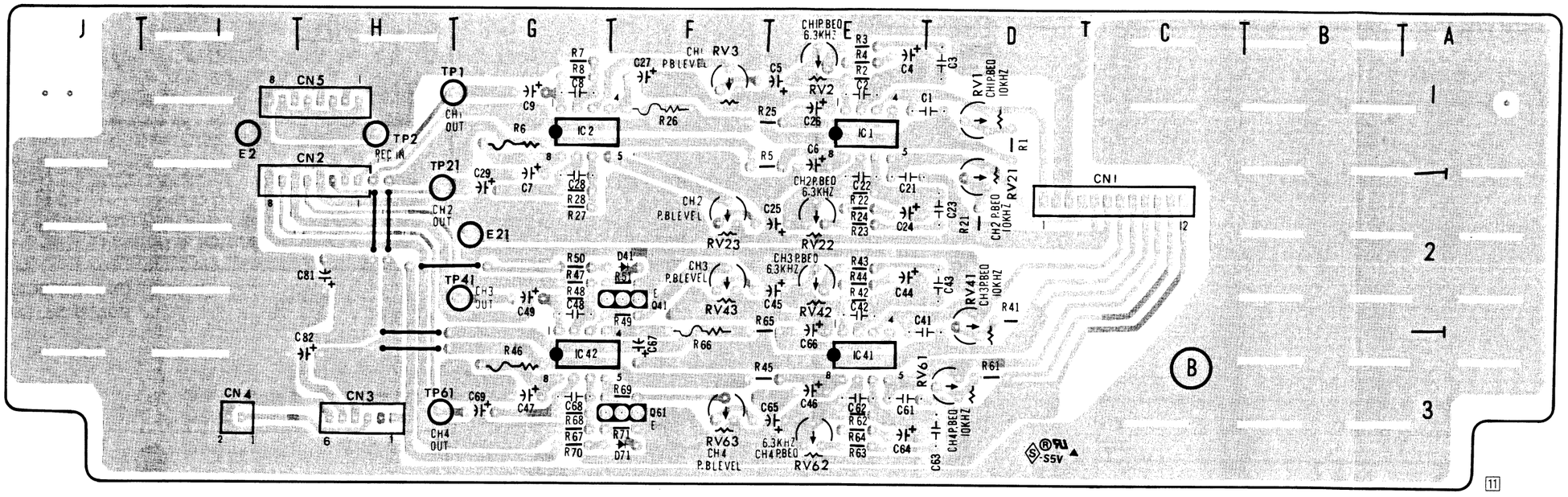
⚠および▨印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⏦ : fusible resistor.
- " ＊ " mark parts are adjustment parts they have varied value.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

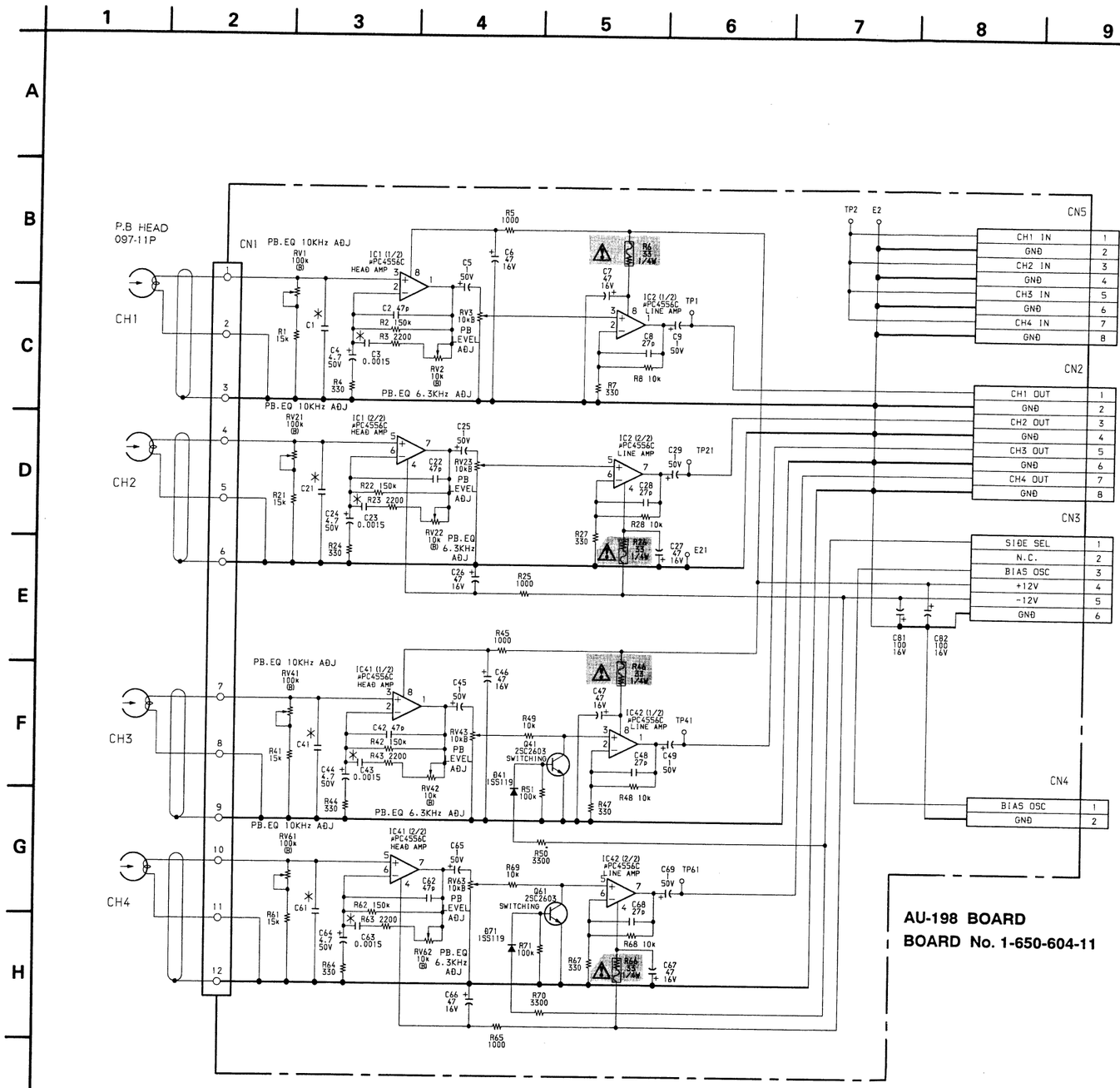
6-7. AU-198 BOARD – *Soldering Side* –



AU-198 BOARD
BOARD No. 1-650-604-11

AU-198

CN1	C-2	IC1	E-1	R66	F-3	RV61	D-3
CN2	H-2	IC2	G-1			RV62	E-3
CN3	H-3	IC41	E-3	RV1	D-1	RV63	F-3
CN4	I-3	IC42	G-3	RV2	E-1		
CN5	H-1			RV3	F-1	TP1	H-1
		Q41	F-2	RV21	D-2	TP2	H-1
D41	F-2	Q61	F-3	RV22	E-2	TP21	H-2
D71	F-3			RV23	F-2	TP41	G-2
		R6	G-1	RV41	D-2	TP61	H-3
E2	I-1	R26	F-1	RV42	E-2		
E21	G-2	R46	G-3	RV43	F-2		



For SERVICE

To MT-74 P.C.B (CN1)

From SY-3 P. C. B (CN21)

To AU-172 P.C.B (CN5)

AU-198 BOARD
BOARD No. 1-650-604-11

注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ⊣∿⊢はヒューズ抵抗。
- ＊印部品は可変の調整部品です。

⚠および　　印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

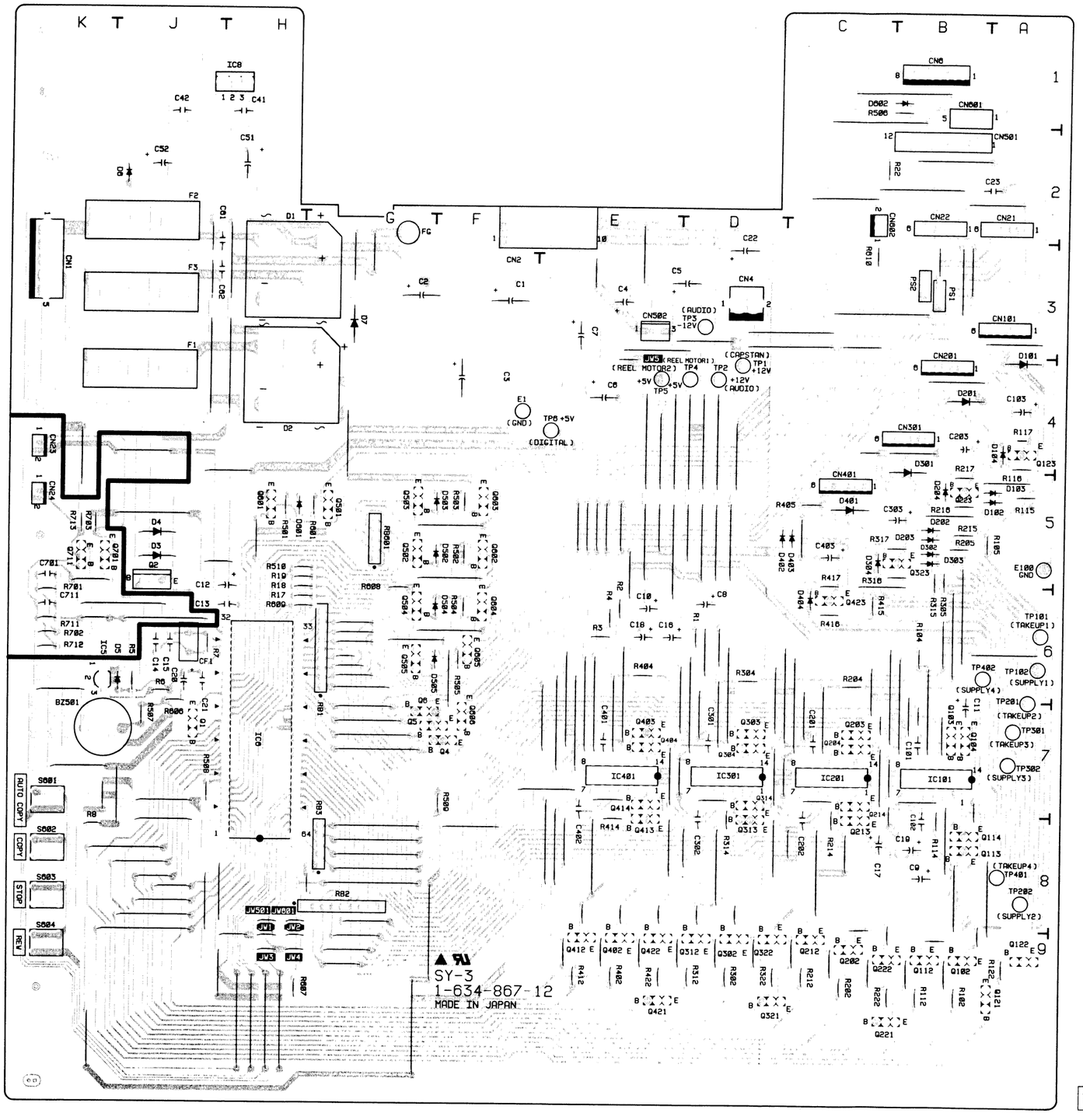
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⊣∿⊢ : fusible resistor.
- C1, 21, 41, 61 No mount.
- " ＊ " mark parts are adjustment parts they have varied value.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

6-8. SY-3 (M), EX-4, SW-7 (M), CN-14 (M), AC-3, AC-5 BOARDS – *Soldering Side* –

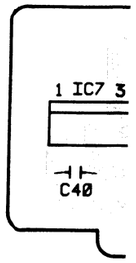
SY-3 (M) BOARD



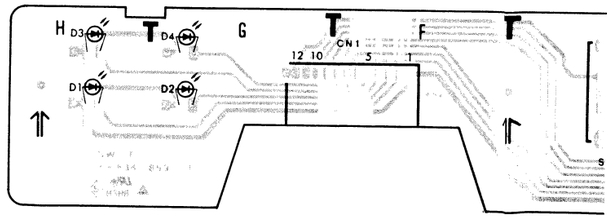
SY-3(M)

CN1	K-3	D201	B-4	IC5	K-6	Q123	A-4	Q414	E-7
CN2	F-2	D202	B-5	IC6	H-7	Q202	C-9	Q421	E-9
CN4	D-3	D203	B-5	IC8	H-1	Q203	C-7	Q422	E-9
CN6	B-1	D204	B-5	IC101	B-7	Q204	C-7	Q423	C-6
CN21	A-2	D301	B-4	IC201	C-7	Q212	C-9	Q501	G-5
CN22	B-2	D302	B-5	IC301	D-7	Q213	C-8	Q502	G-5
CN101	A-3	D303	B-5	IC401	E-7	Q214	C-7	Q503	G-5
CN201	B-4	D304	C-5			Q221	B-9	Q504	G-6
CN301	B-4	D401	C-5	PS1	B-3	Q222	C-9	Q505	G-6
CN401	C-5	D402	D-5	PS2	B-3	Q223	B-5		
CN501	B-2	D403	C-5			Q302	D-9	TP1	D-4
CN502	E-3	D404	C-6	Q1	J-7	Q303	D-7	TP2	D-4
		D502	F-5	Q2	J-6	Q304	D-7	TP3	D-3
D1	H-3	D503	F-5	Q4	F-7	Q312	D-9	TP4	D-4
D2	H-4	D504	F-6	Q5	F-7	Q313	D-8	TP5	E-4
D3	J-5	D505	F-6	Q6	F-7	Q314	D-7	TP6	E-4
D4	J-5			Q102	B-9	Q321	D-9	TP101	A-6
D5	J-6	E1	F-4	Q103	B-7	Q322	D-9	TP102	A-6
D6	J-2	E100	A-5	Q104	A-7	Q323	B-5	TP201	A-6
D7	G-3			Q112	B-9	Q402	E-9	TP202	A-8
D101	A-4	F1	J-4	Q113	B-8	Q403	E-7	TP301	A-7
D102	A-5	F2	J-2	Q114	B-8	Q404	E-7	TP302	A-7
D103	A-5	F3	J-3	Q121	A-9	Q412	E-9	TP401	A-8
D104	A-4			Q122	A-9	Q413	E-8	TP402	A-6

EX-4 BOAR



SW-7 (M) BOARD

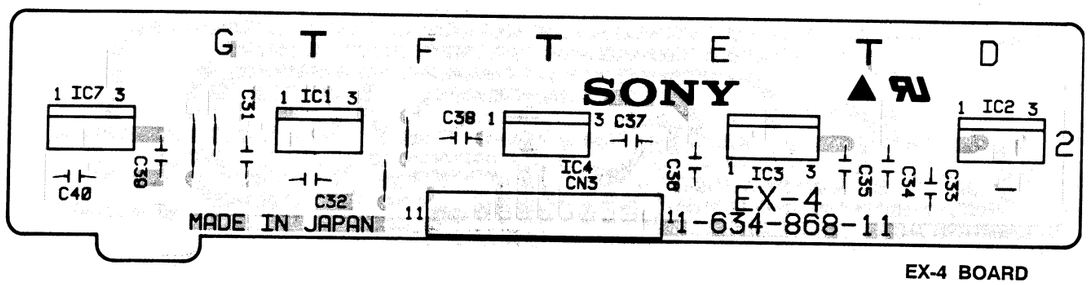


12

SY-3 (M) BOARD
BOARD No. 1-634-867-12

EX-4 BOARD

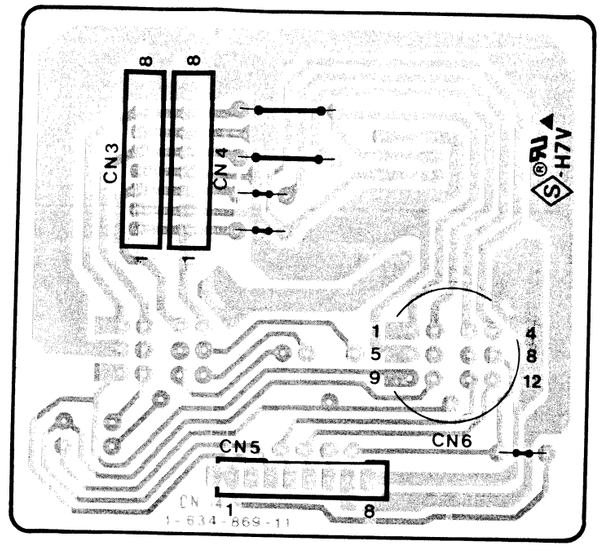
Q414	E-7
Q421	E-9
Q422	E-9
Q423	C-6
Q501	G-5
Q502	G-5
Q503	G-5
Q504	G-6
Q505	G-6
TP1	D-4
TP2	D-4
TP3	D-3
TP4	D-4
TP5	E-4
TP6	E-4
TP101	A-6
TP102	A-6
TP201	A-6
TP202	A-8
TP301	A-7
TP302	A-7
TP401	A-8
TP402	A-6



11

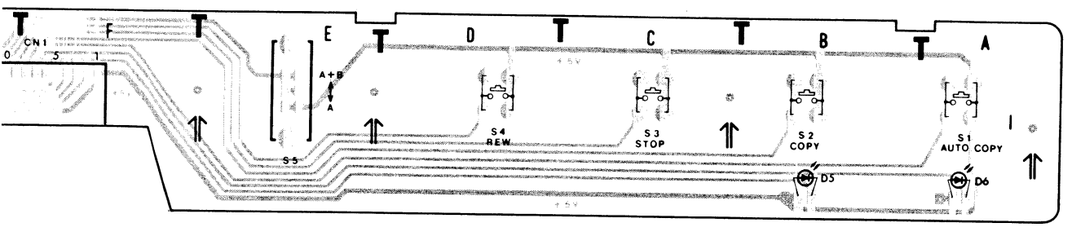
EX-4 BOARD
BOARD No. 1-634-868-11

CN-14 (M) BOARD



11

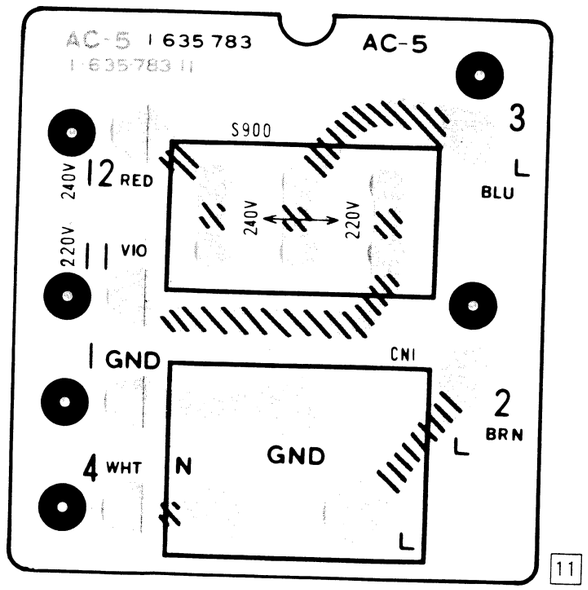
CN-14 (M) BOARD
BOARD No. 1-634-869-11



11

SW-7 (M) BOARD
BOARD No. 1-634-859-11

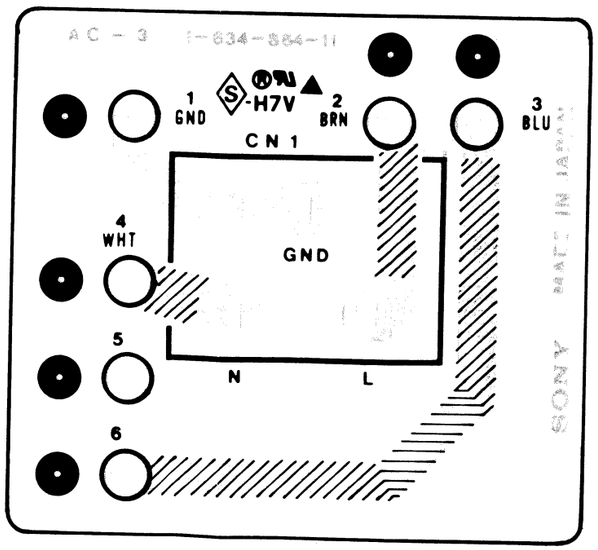
AC-5 BOARD (EK MODEL)



11

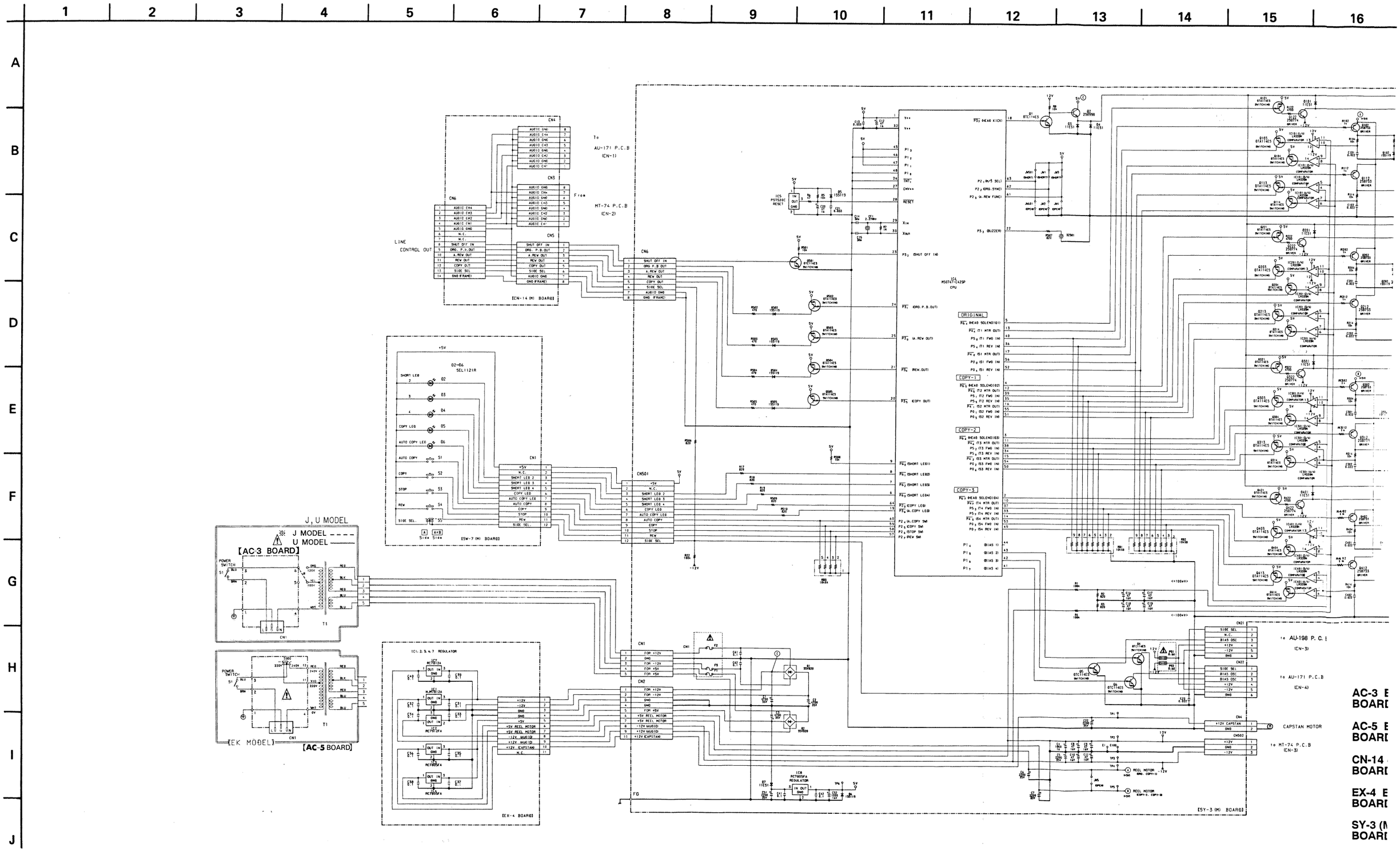
AC-5 BOARD
BOARD No. 1-635-783-11

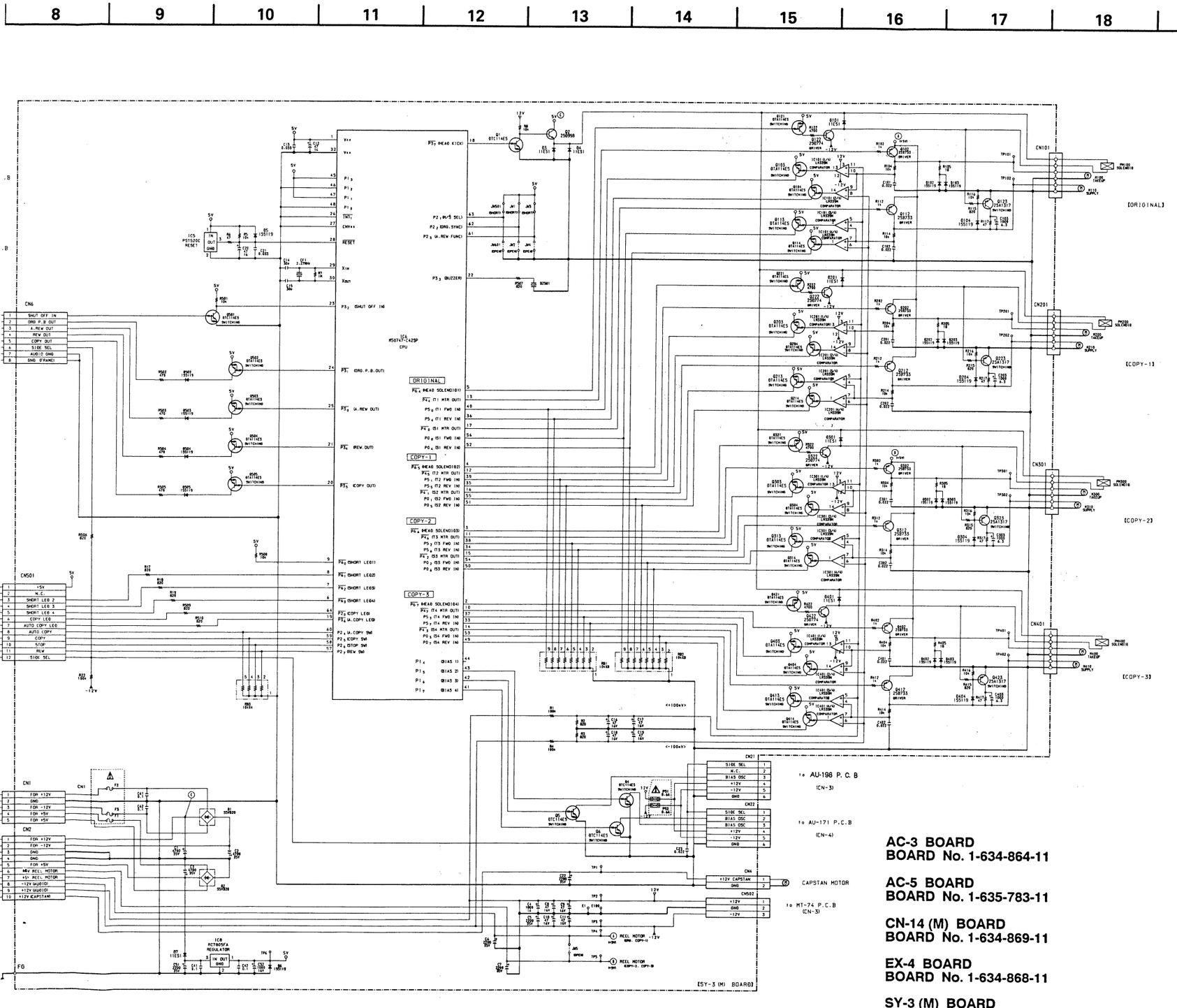
AC-3 BOARD (J, U MODEL)



11

AC-3 BOARD
BOARD No. 1-634-864-11


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
A B C D E F G H I J
CN4
CN5
CN6
AUDIO CH4
AUDIO CH3
AUDIO CH2
AUDIO CH1
AUDIO GND
N.C.
SHUT OFF IN
ORG. P.B.OUT
A.REV OUT
REV OUT
COPY OUT
SIDE SEL
GND (FRAME)
To AU-171 P.C.B (CN-1)
From MT-74 P.C.B (CN-2)
LINE CONTROL OUT
[CN-14 (M) BOARD]
CN6
SHUT OFF IN
ORG P.B OUT
A.REV OUT
REV OUT
COPY OUT
SIDE SEL
AUDIO GND
GND (FRAME)
+5V
02-06 SEL1121R
SHORT LED
COPY LED
AUTO COPY LED
AUTO COPY
COPY
STOP
REW
SIDE SEL.
S1
S2
S3
S4
S5
A
A+B
Side A
Side B
[SW-7 (M) BOARD]
CN1
+5V
N.C.
SHORT LED 2
SHORT LED 3
SHORT LED 4
COPY LED
AUTO COPY LED
AUTO COPY
COPY
STOP
REW
SIDE SEL.
CN501
J, U MODEL
J MODEL
U MODEL
【AC-3 BOARD】
POWER SWITCH
LOW GN
CN1
T1
【EK MODEL】
【AC-5 BOARD】
IC1, 2, 3, 4, 7 REGULATOR
RC4012A
NJM2012A
RC7912FA
RC7805FA
IC6
RC7805FA REGULATOR
CN1
FOR +12V
FOR -12V
FOR +5V
CN2
GND
+5V REEL MOTOR
-12V AUDIO
+12V AUDIO
+12V CAPSTAN
N.C.
[EX-4 BOARD]
IC5
PST520C
RESET
IC4
M50747-542SP
CPU
ORIGINAL
COPY-1
COPY-2
COPY-3
SHUT OFF IN
ORG. P.B.OUT
A. REV OUT
REV. OUT
COPY OUT
SHORT LED1
SHORT LED2
SHORT LED3
A.COPY LED
A.COPY SW
STOP SW
REV SW
CAPSTAN MOTOR
REEL MOTOR
to AU-198 P.C.B (CN-3)
to AU-171 P.C.B (CN-4)
to MT-74 P.C.B (CN-3)
[SY-3 (M) BOARD]
AC-3 BOARD
AC-5 BOARD
CN-14 BOARD
EX-4 BOARD
SY-3 (M) BOARD
SW-7 (M) BOARD



AC-3 BOARD
BOARD No. 1-634-864-11

AC-5 BOARD
BOARD No. 1-635-783-11

CN-14 (M) BOARD
BOARD No. 1-634-869-11

EX-4 BOARD
BOARD No. 1-634-868-11

SY-3 (M) BOARD
BOARD No. 1-634-867-12

SW-7 (M) BOARD
BOARD No. 1-634-859-11

注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ⏦はヒューズ抵抗。

⚠および　　印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

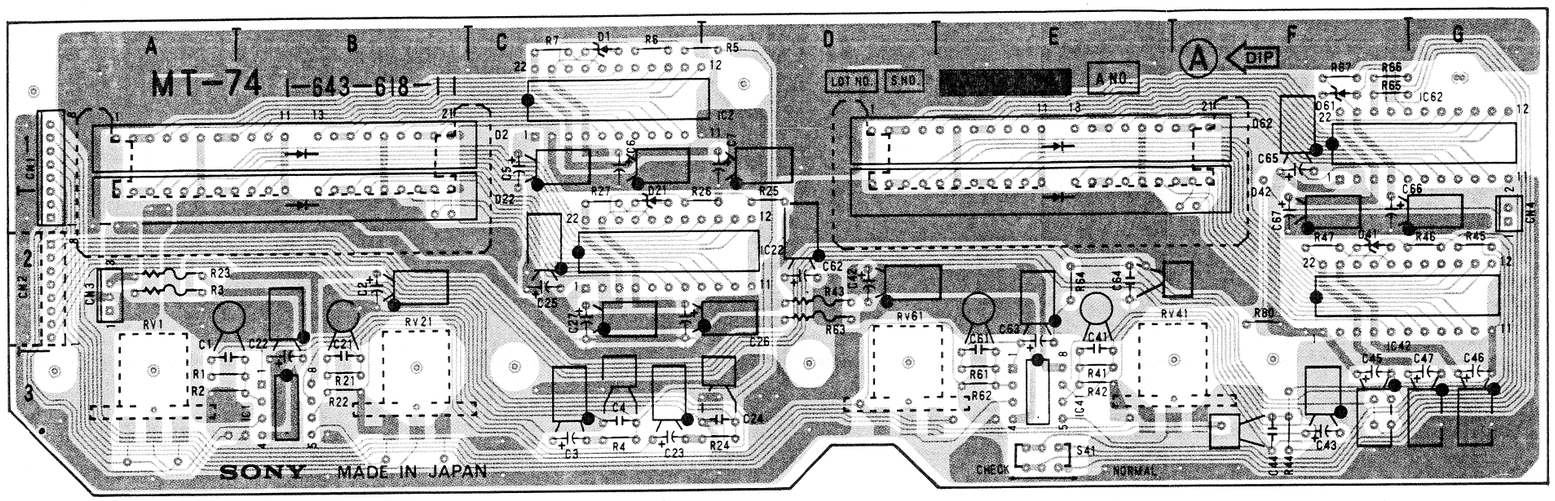
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⏦ : fusible resistor.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

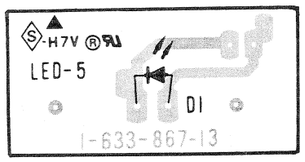
6-9. MT-74, LED-5 (M), VR-148 BOARDS – *Soldering Side* –

MT-74 BOARD



MT-74 BOARD
BOARD No. 1-643-618-11 11

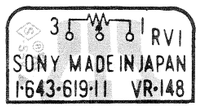
LED-5 (M) BOARD



13

LED-5 (M) BOARD
BOARD No. 1-633-867-13

VR-148 BOARD

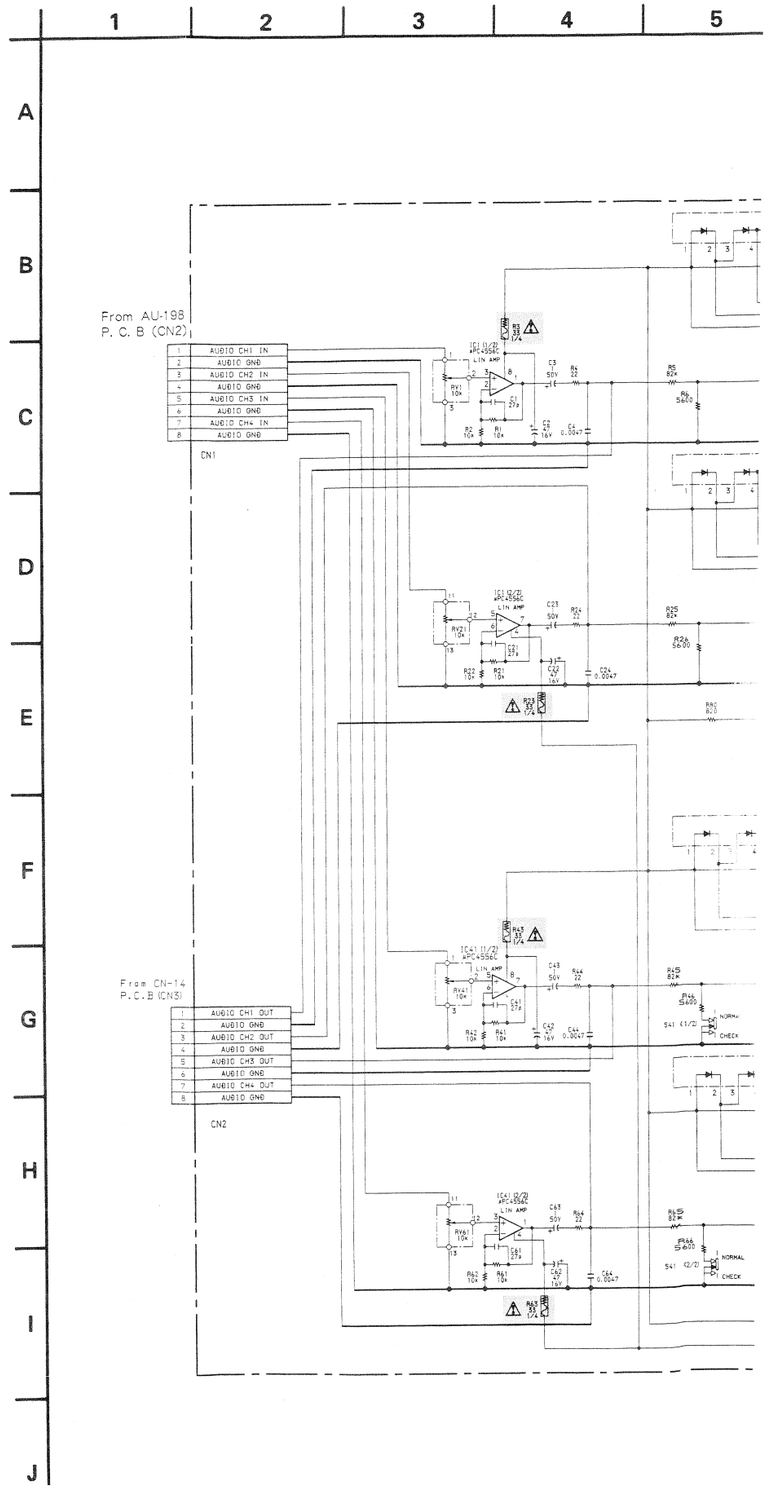


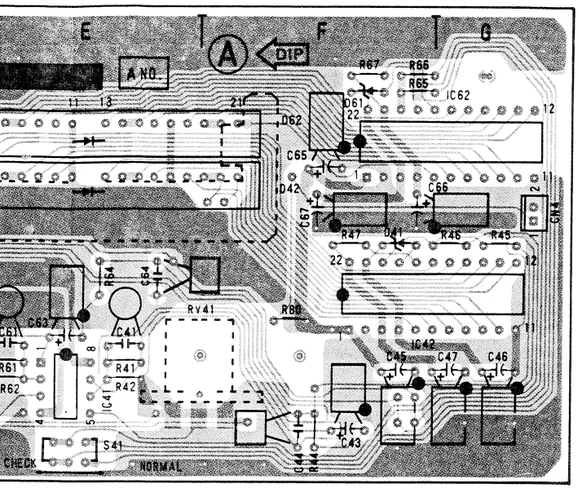
11

VR-148 BOARD
BOARD No. 1-643-619-11

MT-74

CN1	A-1	IC1	B-3
CN2	A-2	IC2	C-1
CN3	A-2	IC22	D-2
CN4	G-2	IC41	E-3
		IC42	G-2
D1	C-1	IC62	G-1
D2	B-1		
D21	C-2	R3	A-2
D22	B-2	R23	A-2
D41	F-2	R43	D-2
D42	E-2	R63	D-2
D61	F-1		
D62	E-1	S41	E-3

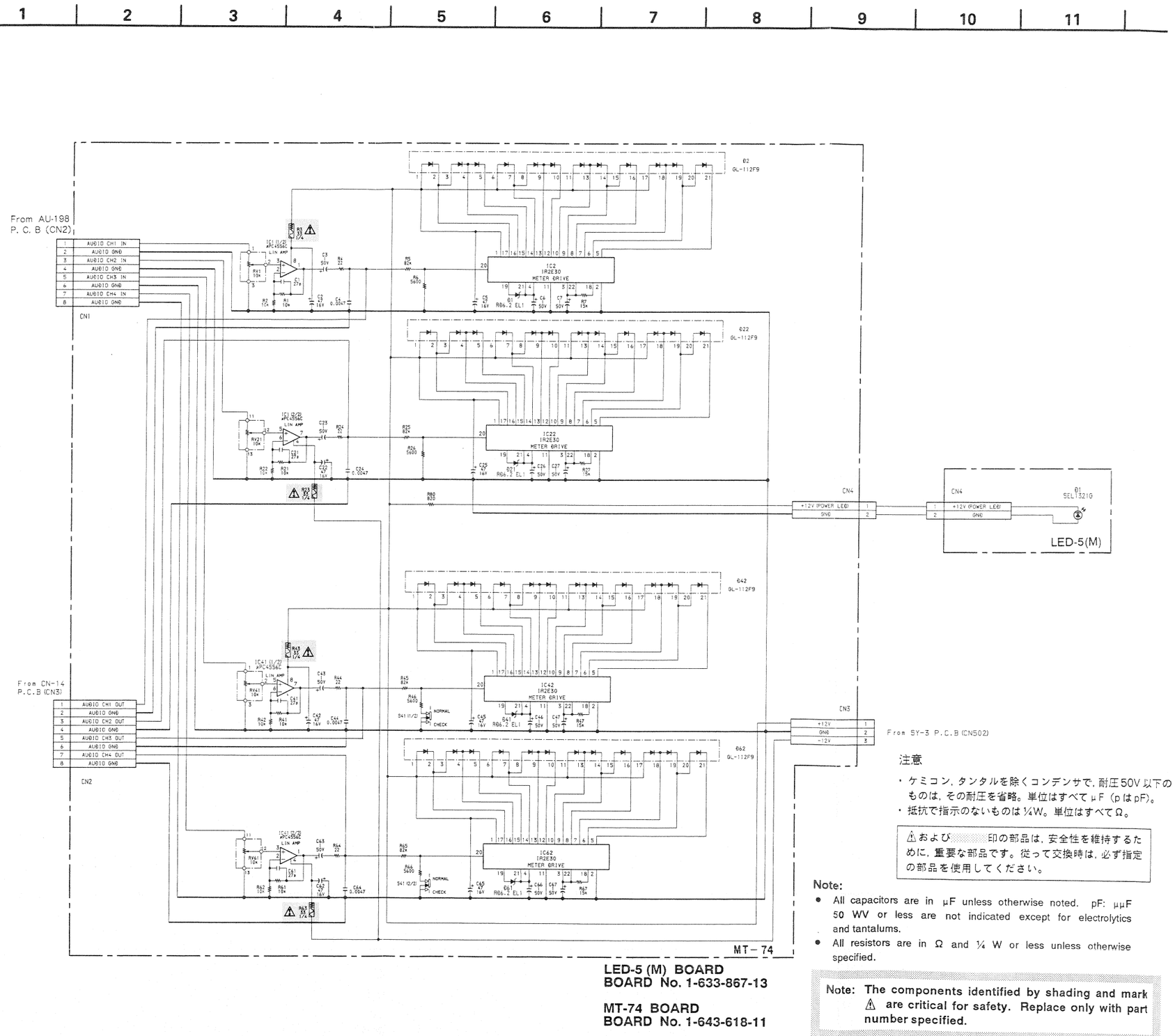




MT-74 BOARD
BOARD No. 1-643-618-11 11

MT-74

CN1	A-1	IC1	B-3
CN2	A-2	IC2	C-1
CN3	A-2	IC22	D-2
CN4	G-2	IC41	E-3
		IC42	G-2
D1	C-1	IC62	G-1
D2	B-1		
D21	C-2	R3	A-2
D22	B-2	R23	A-2
D41	F-2	R43	D-2
D42	E-2	R63	D-2
D61	F-1		
D62	E-1	S41	E-3



LED-5 (M) BOARD
BOARD No. 1-633-867-13

MT-74 BOARD
BOARD No. 1-643-618-11

VR-148 BOARD
BOARD No. 1-643-619-11

注意

・ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
・抵抗で指示のないものは¼W。単位はすべてΩ。

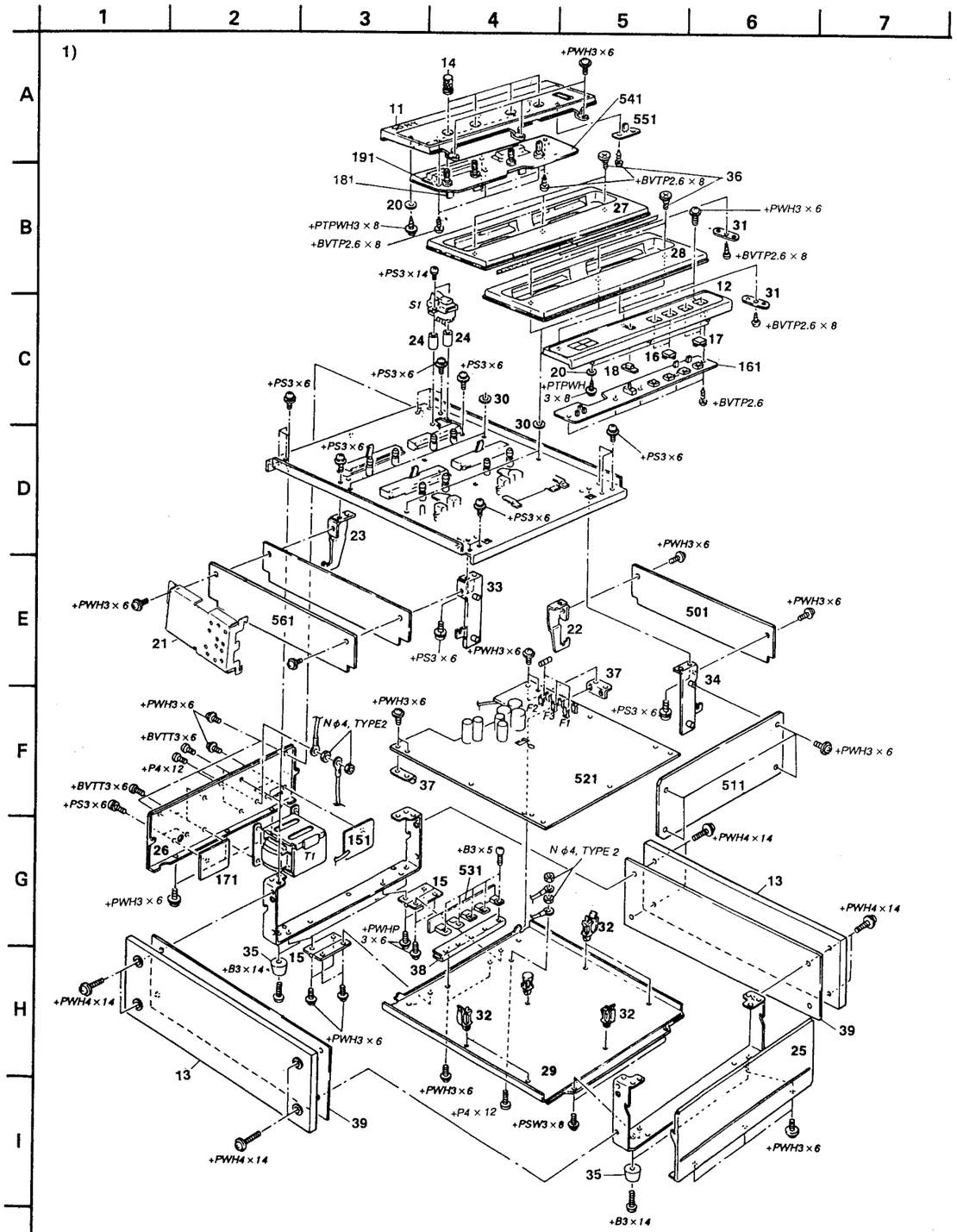
⚠および▨印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

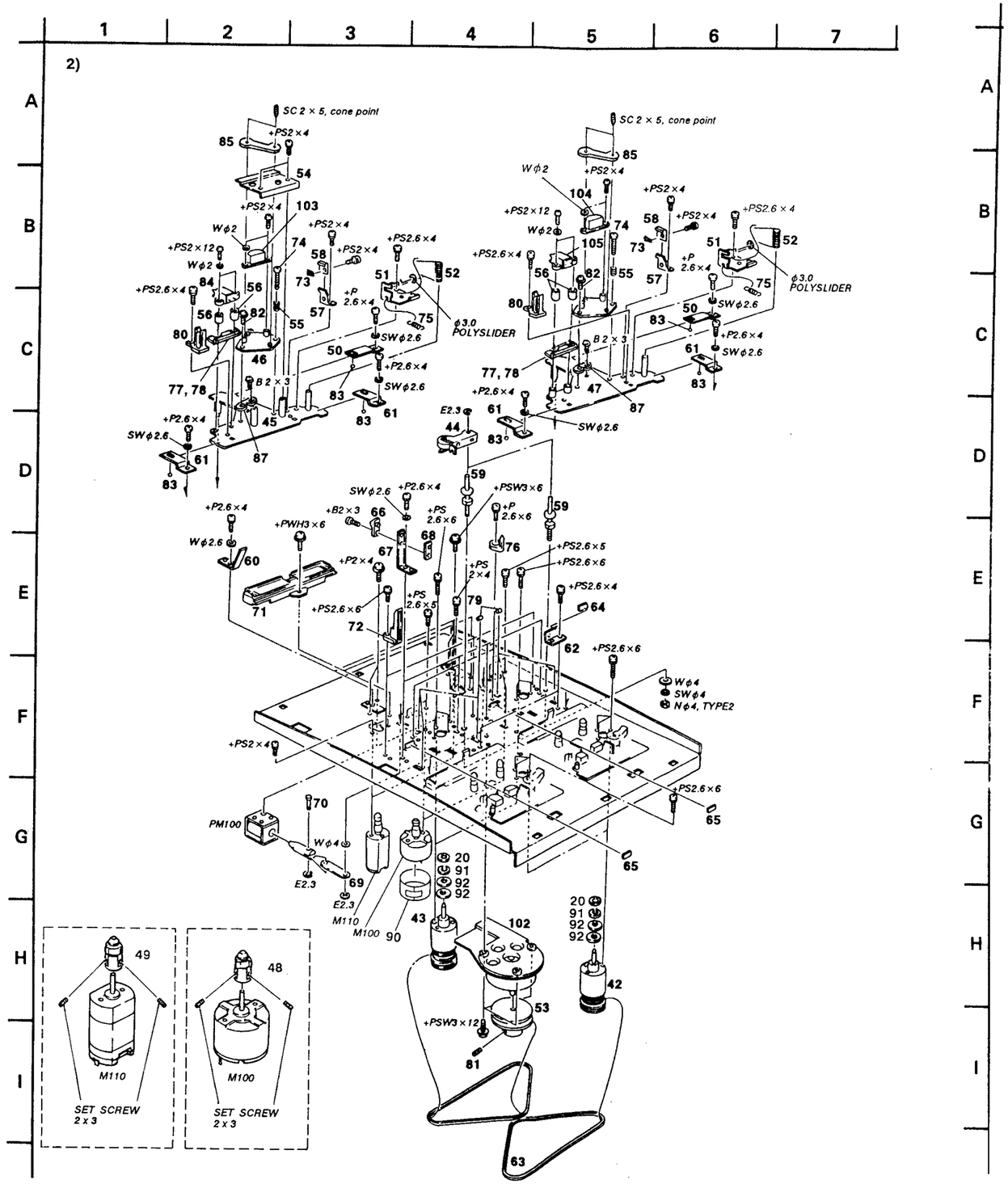
Note:

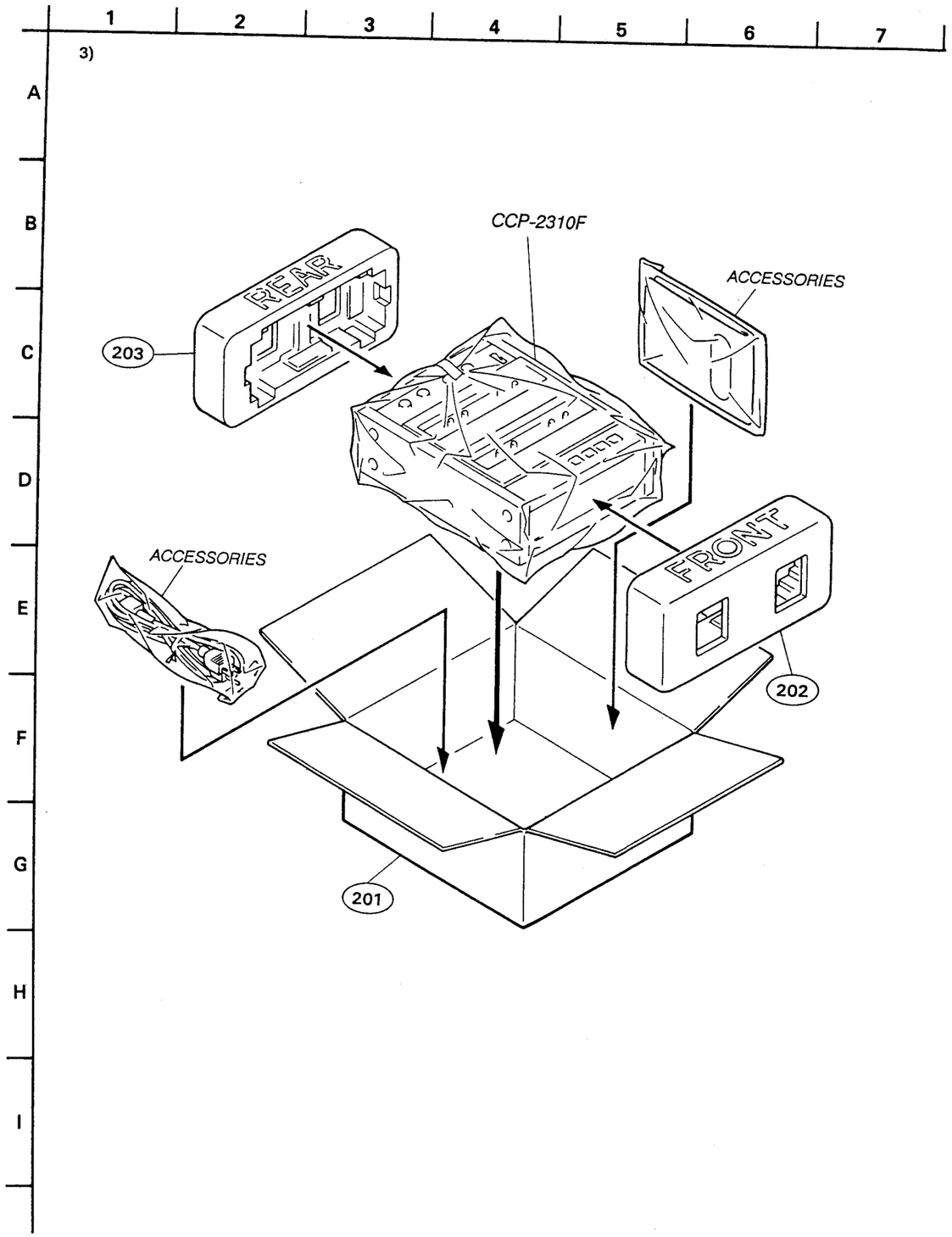
- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 7
EXPLODED VIEWS







(1)

Ref. No. or Q'ty	Part No.	SP	Description
11	X-3167-337-1	o	PANEL ASSY,METER
12	X-3167-338-1	o	PANEL ASSY,SWITCH
13	X-3162-347-2	o	PANEL ASSY,SIDE
14	X-3668-075-0	s	KNOB ASSY,CONTROL
15	3-151-905-12	o	HINGE,DOOR
16	3-162-327-01	s	BUTTON
17	3-162-327-21	s	BUTTON
18	3-162-328-01	s	KNOB
20	3-162-415-01	s	WASHER,THRUST
21	3-176-202-01	o	PLATE,SHIELD
22	3-164-239-01	o	BRACKET(RIGHT),PC BOARD
23	3-164-240-01	o	BRACKET(LEFT),PC BOARD
24	3-164-242-01	o	SPACER,SWITCH
25	3-164-261-11	o	PANEL,FRONT
26	3-164-262-02	o	PANEL,REAR
27	3-164-265-41	o	PANEL,CASSETTE
28	3-164-265-51	o	PANEL,CASSETTE
29	3-164-266-01	o	PLATE,BOTTOM
30	3-564-027-01	o	FELT,LIMITER
31	3-668-743-00	o	NUT,PLATE,ROLLER,PRECEDING
32	3-682-047-01	o	HOLDER(A),PC BOARD
33	3-176-199-01	o	BRACKET(LEFT),PC BOARD
34	3-176-200-01	o	BRACKET(RIGHT),PC BOARD
35	3-164-260-01	s	FOOT,RUBBER
36	3-694-825-11	s	SCREW(M3)(STEP),SPECIAL HEAD
37	3-164-251-01	o	SUPORT,PC BOARD
38	3-164-252-01	o	HEAT SINK
39	3-170-051-01	o	PLATE,SHIELD

(2)

Ref. No. or Q'ty	Part No.	SP	Description
20	3-162-415-01	s	WASHER,THRUST
42	A-2109-009-A	o	CAPSTAN(B) ASSY(COPY2)
	A-2109-010-A	o	CAPSTAN(A) ASSY(COPY3)
43	A-2109-010-A	o	CAPSTAN(A) ASSY(ORIGINAL)
	A-2109-009-A	o	CAPSTAN(B) ASSY(COPY1)
44	X-3162-306-1	s	PINCH ROLLER ASSY
45	X-3162-342-2	o	CHASSIS(P) ASSY,HEAD(ORIGINAL)
46	X-3162-343-1	o	PLATE ASSY,ADJUSTMENT,HEAD
47	X-3162-344-2	o	CHASSIS(R) ASSY,HEAD(COPY1-3)
48	X-3162-348-1	o	TABLE(RIGHT) ASSY,REEL
49	X-3162-349-1	o	TABLE(LEFT) ASSY,REEL
50	3-162-312-01	o	SPRING
51	3-162-345-02	o	HOOK,SPRING
52	3-162-399-01	s	SPRING
53	3-164-221-01	s	PULLEY,MOTOR
54	3-164-231-01	o	PLATE,SHIELD,HEAD
55	3-164-232-01	s	SPRING,COMPRESSION
56	3-164-233-01	o	SPACER,ERASE HEAD
57	3-164-234-02	o	BRACKET,BRUSH
58	3-164-235-01	o	RETAINER,BRUSH
59	3-164-236-01	o	SHAFT,PINCH ROLLER
60	3-164-237-01	o	SPRING,CASSETTE RETAINER
61	3-164-238-01	o	RETAINER(B),HEAD CHASSIS
62	3-164-241-01	o	BRACKET,BRUSH
63	3-164-243-01	s	BELT,CAPSTAN
64	3-164-244-01	s	STOPPER,HEAD CHASSIS
65	3-164-245-01	s	CUSHION,CHASSIS
66	3-164-246-01	o	RETAINER,CASSETTE
67	3-164-247-01	s	SPRING,CASSETTE RETAINER
68	3-164-248-01	o	RETAINER,CASSETTE
69	3-164-249-01	o	PLATE SOLENOID
70	3-164-250-01	o	SHAFT,JOINT
71	3-164-259-01	o	CASSETTE,RETAINER
72	3-164-271-01	s	GUIDE,CASSETTE
73	3-164-272-02	s	BRUSH,ELECTROSTATIC PREVENTION
74	3-418-191-00	s	SCREW
75	3-165-191-01	s	SPRING,TENSION
76	3-491-131-00	s	PIN,CASSETTE GUIDE
77	3-166-369-01	s	SPACER,HEAD
78	3-166-369-11	s	SPACER,HEAD
79	3-558-448-00	s	ROLLER,HEAD CHASSIS
80	3-576-837-00	s	CLAMP,LEAD
81	3-701-509-00	s	SET SCREW,DOUBLE CUP 3x8
82	7-621-770-67	s	SCREW(M2.6x6),(+)SPECIAL HEAD
83	7-671-112-01	o	STEEL,BALL
84	8-825-724-00	s	HEAD,ERASE EF-201-36
85	3-165-188-01	s	SPACER(1),ADJUSTMENT PLATE
87	3-165-189-02	s	SPACER(2),ADJUSTMENT PLATE
90	3-162-496-01	o	CORE,SHIELD
91	3-162-416-01	o	RING(SHAFT),RETAINING
92	3-701-439-21	s	WASHER

(3)

PACKING MATERIALS

Ref. No. or Q'ty	Part No.	SP	Description
201	3-176-137-21	o	INDIVIDUAL CARTON
202	3-164-215-01	o	CUSHION(FRONT)
203	3-164-216-01	o	CUSHION(REAR)

SUPPLIED ACCESSORIES

Ref. No. or Q'ty	Part No.	SP	Description
1set	X-3701-105-0	s	ROD ASSY,CLEANING,HEAD
1pc	⚠1-534-754-00	s	POWER CORD(FOR J MODEL ONLY)
1pc	⚠1-551-812-11	s	POWER CORD(FOR U MODEL ONLY)
1set	⚠1-590-910-11	s	POWER CORD,SET(FOR EK MODEL ONLY)
1pc	3-164-273-01	s	DUST COVER
1pc	3-758-025-01	s	MANUAL,INSTRUCTION(LARGE) (FOR J MODEL ONLY)
1pc	3-758-025-11	s	MANUAL,INSTRUCTION(LARGE) (FOR U MODEL ONLY)
1pc	3-758-025-21	s	MANUAL,INSTRUCTION(LARGE) (FOR EK MODEL ONLY)

SECTION 8
ELECTRICAL PARTS LIST

PARTS INFORMATION

(1) Safety Related Components Warning
Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts witch actually in use due to "accommodating the improved parts and /or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors and Resistors
The following units may be assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.
Capacitors : μF
Resistors : Ω

補修用部品注意事項

(1) 安全重要部品
回路図, 分解図, 電気部品表中で⚠印付きの部品は, 安全性を維持するために重要な部品である。従ってこれらの部品を交換する時には, 必ず指定の部品を交換すること。

(2) 部品の共通化
ソニーから供給される部品はセットに実装されているものと異なることがある。
これは部品の共通化, 改良等によるものである。
分解図や電気部品表には現時点での共通化された部品が記載されている。

(3) 部品の在庫
部品表のSP (Supply code) 欄のoで示される部品は交換頻度が低い部品で, 在庫していないことがあり, 納期は長くなることがある。

(4) コンデンサ, 抵抗の単位
回路図, 分解図, 電気部品表中, 特に明記したものを除き, 下記の単位は省略されていることがある。
コンデンサ : μF
抵抗 : Ω

ELECTRICAL PARTS LIST

AC-3 BOARD (FOR J,U MODEL ONLY)

Ref. No. or Q'ty	Part No.	SP	Description
151	1-634-864-11	o	PRINTED CIRCUIT BOARD,AC-3
CN1	⚠1-560-222-11	s	INLET 3P

AC-5 BOARD (FOR EK MODEL ONLY)

Ref. No. or Q'ty	Part No.	SP	Description
151	1-635-783-11	o	PRINTED CIRCUIT BOARD,AC-5
CN1	⚠1-560-222-11	s	INLET 3P
S900	⚠1-570-046-11	s	SWITCH,VOLTAGE CHANGE

AU-171 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
501	A-8276-822-A	o	MOUNTED CIRCUIT BOARD,AU-171
4pcs	1-540-122-11	o	SOCKET,SIL 2P
C1	1-102-108-00	s	CERAMIC 150pF 10% 50V
C2	1-126-301-11	s	ELECT 1uF 20% 50V
C3	1-102-108-00	s	CERAMIC 150pF 10% 50V
C4	1-124-589-11	s	ELECT 47uF 20% 16V
C5	1-124-257-00	s	ELECT 2.2uF 20% 50V
C6	1-102-973-00	s	CERAMIC 100pF 5% 50V
C7	1-130-471-00	s	MYLAR 0.001uF 5% 50V
C8	1-107-157-00	s	MICA 27pF 10% 500V
C21	1-102-108-00	s	CERAMIC 150pF 10% 50V
C22	1-126-301-11	s	ELECT 1uF 20% 50V
C23	1-102-108-00	s	CERAMIC 150pF 10% 50V
C24	1-124-589-11	s	ELECT 47uF 20% 16V
C25	1-124-257-00	s	ELECT 2.2uF 20% 50V
C26	1-102-973-00	s	CERAMIC 100pF 5% 50V
C27	1-130-471-00	s	MYLAR 0.001uF 5% 50V
C28	1-107-157-00	s	MICA 27pF 10% 500V
C41	1-102-108-00	s	CERAMIC 150pF 10% 50V
C42	1-126-301-11	s	ELECT 1uF 20% 50V
C43	1-102-108-00	s	CERAMIC 150pF 10% 50V
C44	1-124-589-11	s	ELECT 47uF 20% 16V
C45	1-124-257-00	s	ELECT 2.2uF 20% 50V
C46	1-102-973-00	s	CERAMIC 100pF 5% 50V
C47	1-130-471-00	s	MYLAR 0.001uF 5% 50V
C48	1-107-157-00	s	MICA 27pF 10% 500V
C49	1-107-169-00	s	MICA 100pF 5% 500V
C61	1-102-108-00	s	CERAMIC 150pF 10% 50V
C62	1-126-301-11	s	ELECT 1uF 20% 50V
C63	1-102-108-00	s	CERAMIC 150pF 10% 50V
C64	1-124-589-11	s	ELECT 47uF 20% 16V
C65	1-124-257-00	s	ELECT 2.2uF 20% 50V
C66	1-102-973-00	s	CERAMIC 100pF 5% 50V
C67	1-130-471-00	s	MYLAR 0.001uF 5% 50V

(AU-171 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C68	1-107-157-00	s	MICA 27pF 10% 500V
C69	1-107-169-00	s	MICA 100pF 5% 500V
C81	1-130-477-00	s	MYLAR 0.0033uF 5% 50V
C82	1-130-469-00	s	MYLAR 680pF 5% 50V
C83	1-130-012-00	s	FILM 330pF 5% 50V
C84	1-124-122-11	s	ELECT 100uF 20% 50V
C85	1-136-270-11	s	FILM 47pF 5% 630V
C86	1-107-202-11	s	MICA 10pF 10% 500V
C87	1-124-589-11	s	ELECT 47uF 20% 16V
C88	1-124-589-11	s	ELECT 47uF 20% 16V
C89	1-124-122-11	s	ELECT 100uF 20% 50V
C90	1-124-122-11	s	ELECT 100uF 20% 50V
CN1	1-560-470-00	o	PIN,CONNECTOR 8P
CN2	1-560-470-00	o	PIN,CONNECTOR 8P
CN3	1-560-472-00	o	PIN,CONNECTOR 12P
CN4	1-560-469-00	o	PIN,CONNECTOR 6P
CN5	1-560-469-00	o	PIN,CONNECTOR 6P
CN6	1-560-469-00	o	PIN,CONNECTOR 6P
CN7	1-560-456-00	o	PIN,CONNECTOR 2P
CT1	1-141-297-11	s	TRIMMER,CERAMIC 90pF
CT21	1-141-297-11	s	TRIMMER,CERAMIC 90pF
CT41	1-141-297-11	s	TRIMMER,CERAMIC 90pF
CT61	1-141-297-11	s	TRIMMER,CERAMIC 90pF
D81	8-719-200-02	s	DIODE 10E-2
FL1	1-409-407-11	s	COIL,BIAS TRAP 600.0KHz
FL21	1-409-407-11	s	COIL,BIAS TRAP 600.0KHz
FL41	1-409-407-11	s	COIL,BIAS TRAP 600.0KHz
FL61	1-409-407-11	s	COIL,BIAS TRAP 600.0KHz
IC1	8-759-900-72	s	IC NE5532P
IC41	8-759-900-72	s	IC NE5532P
L81	1-410-311-11	s	COIL(SHIELD TYPE)
LV1	1-403-608-11	s	COIL,VARIABLE
LV21	1-403-608-11	s	COIL,VARIABLE
LV41	1-403-608-11	s	COIL,VARIABLE
LV61	1-403-608-11	s	COIL,VARIABLE
LV81	1-424-371-11	s	COIL
Q81	8-729-140-96	s	TRANSISTOR 2SD774-34
Q82	8-729-140-93	s	TRANSISTOR 2SB733-34
Q83	8-729-199-82	s	TRANSISTOR 2SD998
R1	1-249-425-11	s	CARBON 4.7K 5% 1/4W
R2	1-249-417-11	s	CARBON 1K 5% 1/4W
R3	1-249-421-11	s	CARBON 2.2K 5% 1/4W
R4	⚠1-212-869-00	s	FUSIBLE 33 5% 1/4W
R5	1-249-429-11	s	CARBON 10K 5% 1/4W
R6	1-249-408-11	s	CARBON 180 5% 1/4W
R7	1-249-421-11	s	CARBON 2.2K 5% 1/4W
R8	1-249-425-11	s	CARBON 4.7K 5% 1/4W
R10	1-249-393-11	s	CARBON 10 5% 1/4W
R21	1-249-425-11	s	CARBON 4.7K 5% 1/4W
R22	1-249-417-11	s	CARBON 1K 5% 1/4W
R23	1-249-421-11	s	CARBON 2.2K 5% 1/4W
R24	⚠1-212-869-00	s	FUSIBLE 33 5% 1/4W
R25	1-249-429-11	s	CARBON 10K 5% 1/4W
R26	1-249-408-11	s	CARBON 180 5% 1/4W

(AU-171 BOA

Ref. No. or Q'ty	Pa
R27	1-
R28	1-
R30	1-
R41	1-
R42	1-
R43	1-
R44	⚠1-
R45	1-
R46	1-
R47	1-
R48	1-
R50	1-
R61	1-
R62	1-
R63	1-
R64	⚠1-
R65	1-
R66	1-
R67	1-
R68	1-
R70	1-
R81	1-
R82	1-
R83	1
R84	1
R85	1-
R86	1-
R87	⚠1-
R88	1-
R89	1-
R90	1-
R91	1-
R92	1-
RV1	1-
RV21	1
RV41	1
RV61	1
RY81	1
RY82	
T81	1-4

AU-172 BOARD

Ref. No. or Q'ty	Par
511	A-8
8pcs	1-5
C1	1-1
C2	1-1
C3	1-1
C4	1-1
C5	1-1
C6	1-1
C7	1-1
C8	1-1
C21	1-1

(AU-171 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description			
R27	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R28	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R30	1-249-393-11	s	CARBON	10	5%	1/4W
R41	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R42	1-249-417-11	s	CARBON	1K	5%	1/4W
R43	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R44	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R45	1-249-429-11	s	CARBON	10K	5%	1/4W
R46	1-249-408-11	s	CARBON	180	5%	1/4W
R47	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R48	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R50	1-249-393-11	s	CARBON	10	5%	1/4W
R61	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R62	1-249-417-11	s	CARBON	1K	5%	1/4W
R63	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R64	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R65	1-249-429-11	s	CARBON	10K	5%	1/4W
R66	1-249-408-11	s	CARBON	180	5%	1/4W
R67	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R68	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R70	1-249-393-11	s	CARBON	10	5%	1/4W
R81	1-249-431-11	s	CARBON	15K	5%	1/4W
R82	1-249-399-11	s	CARBON	33	5%	1/4W
R83	1-249-385-11	s	CARBON	2.2	5%	1/4W
R84	1-249-385-11	s	CARBON	2.2	5%	1/4W
R85	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R86	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R87	⚠1-217-638-21	s	FUSIBLE	1.5	5%	1/4W
R88	1-249-429-11	s	CARBON	10K	5%	1/4W
R89	1-249-441-11	s	CARBON	100K	5%	1/4W
R90	1-249-393-11	s	CARBON	10	5%	1/4W
R91	1-249-439-11	s	CARBON	68K	5%	1/4W
R92	1-249-393-11	s	CARBON	10	5%	1/4W
RV1	1-230-523-11	s	RES,ADJ,METAL,GLAZE	10K		
RV21	1-230-523-11	s	RES,ADJ,METAL,GLAZE	10K		
RV41	1-230-523-11	s	RES,ADJ,METAL,GLAZE	10K		
RV61	1-230-523-11	s	RES,ADJ,METAL,GLAZE	10K		
RY81	1-515-683-11	s	RELAY			
RY82	1-515-683-11	s	RELAY			
T81	1-423-952-11	s	TRANSFORMER,BIAS OSCILLATION			

AU-172 BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
511	A-8276-823-A	o	MOUNTED CIRCUIT BOARD,AU-172			
8pcs	1-540-122-11	o	SOCKET,SIL 2P			
C1	1-102-108-00	s	CERAMIC	150pF	10%	50V
C2	1-126-301-11	s	ELECT	1uF	20%	50V
C3	1-102-108-00	s	CERAMIC	150pF	10%	50V
C4	1-124-589-11	s	ELECT	47uF	20%	50V
C5	1-124-257-00	s	ELECT	2.2uF	20%	50V
C6	1-102-973-00	s	CERAMIC	100pF	5%	50V
C7	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C8	1-107-157-00	s	MICA	27pF	10%	500V
C21	1-102-108-00	s	CERAMIC	150pF	10%	50V
C22	1-126-301-11	s	ELECT	1uF	20%	50V
C23	1-102-108-00	s	CERAMIC	150pF	10%	50V
C24	1-124-589-11	s	ELECT	47uF	20%	50V
C25	1-124-257-00	s	ELECT	2.2uF	20%	50V
C26	1-102-973-00	s	CERAMIC	100pF	5%	50V
C27	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C28	1-107-157-00	s	MICA	27pF	10%	500V
C41	1-102-108-00	s	CERAMIC	150pF	10%	50V
C42	1-126-301-11	s	ELECT	1uF	20%	50V
C43	1-102-108-00	s	CERAMIC	150pF	10%	50V
C44	1-124-589-11	s	ELECT	47uF	20%	50V
C45	1-124-257-00	s	ELECT	2.2uF	20%	50V
C46	1-102-973-00	s	CERAMIC	100pF	5%	50V
C47	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C48	1-107-157-00	s	MICA	27pF	10%	500V
C49	1-107-169-00	s	MICA	100pF	5%	500V
C61	1-102-108-00	s	CERAMIC	150pF	10%	50V
C62	1-126-301-11	s	ELECT	1uF	20%	50V
C63	1-102-108-00	s	CERAMIC	150pF	10%	50V
C64	1-124-589-11	s	ELECT	47uF	20%	50V
C65	1-124-257-00	s	ELECT	2.2uF	20%	50V
C66	1-102-973-00	s	CERAMIC	100pF	5%	50V
C67	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C68	1-107-157-00	s	MICA	27pF	10%	500V
C69	1-107-169-00	s	MICA	100pF	5%	500V
C81	1-130-477-00	s	MYLAR	0.0033uF	5%	50V
C82	1-130-469-00	s	MYLAR	680pF	5%	50V
C83	1-130-012-00	s	FILM	330pF	5%	50V
C84	1-124-122-11	s	ELECT	100uF	20%	50V
C85	1-130-270-11	s	FILM	47pF	5%	630V
C86	1-107-202-00	s	MICA	10pF	5%	500V
C87	1-124-589-11	s	ELECT	47uF	20%	16V
C88	1-124-122-11	s	ELECT	100uF	20%	50V
C89	1-124-122-11	s	ELECT	100uF	20%	50V
C101	1-102-108-00	s	CERAMIC	150pF	10%	50V
C102	1-126-301-11	s	ELECT	1uF	20%	50V
C103	1-102-108-00	s	CERAMIC	150pF	10%	50V
C104	1-124-589-11	s	ELECT	47uF	20%	50V
C105	1-124-257-00	s	ELECT	2.2uF	20%	50V
C106	1-102-973-00	s	CERAMIC	100pF	5%	50V
C107	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C108	1-107-157-00	s	MICA	27pF	10%	500V
C121	1-102-108-00	s	CERAMIC	150pF	10%	50V
C122	1-126-301-11	s	ELECT	1uF	20%	50V
C123	1-102-108-00	s	CERAMIC	150pF	10%	50V
C124	1-124-589-11	s	ELECT	47uF	20%	50V
C125	1-124-257-00	s	ELECT	2.2uF	20%	50V
C126	1-102-973-00	s	CERAMIC	100pF	5%	50V
C127	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C128	1-107-157-00	s	MICA	27pF	10%	500V
C141	1-102-108-00	s	CERAMIC	150pF	10%	50V
C142	1-126-301-11	s	ELECT	1uF	20%	50V
C143	1-102-108-00	s	CERAMIC	150pF	10%	50V
C144	1-124-589-11	s	ELECT	47uF	20%	50V
C145	1-124-257-00	s	ELECT	2.2uF	20%	50V
C146	1-102-973-00	s	CERAMIC	100pF	5%	50V
C147	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C148	1-107-157-00	s	MICA	27pF	10%	500V
C149	1-107-169-00	s	MICA	100pF	5%	500V
C161	1-102-108-00	s	CERAMIC	150pF	10%	50V

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Ref. No. or Q'ty	Part No.	SP	Description			
C162	1-126-301-11	s	ELECT	1uF	20%	50V
C163	1-102-108-00	s	CERAMIC	150pF	10%	50V
C164	1-124-589-11	s	ELECT	47uF	20%	50V
C165	1-124-257-00	s	ELECT	2.2uF	20%	50V
C166	1-102-973-00	s	CERAMIC	100pF	5%	50V
C167	1-130-471-00	s	MYLAR	0.001uF	5%	50V
C168	1-107-157-00	s	MICA	27pF	10%	500V
C169	1-107-169-00	s	MICA	100pF	5%	500V
C181	1-130-477-00	s	MYLAR	0.0033uF	5%	50V
C182	1-130-469-00	s	MYLAR	680pF	5%	50V
C183	1-130-012-00	s	FILM	330pF	5%	50V
C184	1-124-122-11	s	ELECT	100uF	20%	50V
C185	1-136-270-11	s	FILM	47pF	5%	630V
C186	1-107-202-00	s	MICA	10pF	5%	500V
CN1	1-560-470-00	o	PIN,CONNECTOR	8P		
CN2	1-560-472-00	o	PIN,CONNECTOR	12P		
CN3	1-560-472-00	o	PIN,CONNECTOR	12P		
CN4	1-560-469-00	o	PIN,CONNECTOR	6P		
CN5	1-560-456-00	o	PIN,CONNECTOR	2P		
CT1	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT21	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT41	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT61	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT101	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT121	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT141	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
CT161	1-141-297-11	s	TRIMMER,CERAMIC	90pF		
D81	8-719-200-02	s	DIODE	10E-2		
D181	8-719-200-02	s	DIODE	10E-2		
FL1	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL21	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL41	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL61	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL101	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL121	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL141	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
FL161	1-409-407-11	s	COIL,BIAS TRAP	600.0KHz		
IC1	8-759-900-72	s	IC	NE5532P		
IC41	8-759-900-72	s	IC	NE5532P		
IC101	8-759-900-72	s	IC	NE5532P		
IC141	8-759-900-72	s	IC	NE5532P		
L81	1-410-311-11	s	COIL(SHIELD TYPE)			
L181	1-410-311-11	s	COIL(SHIELD TYPE)			
LV1	1-403-608-11	s	COIL,VARIABLE			
LV21	1-403-608-11	s	COIL,VARIABLE			
LV41	1-403-608-11	s	COIL,VARIABLE			
LV61	1-403-608-11	s	COIL,VARIABLE			
LV81	1-424-371-11	s	COIL			
LV101	1-403-608-11	s	COIL,VARIABLE			
LV121	1-403-608-11	s	COIL,VARIABLE			
LV141	1-403-608-11	s	COIL,VARIABLE			
LV161	1-403-608-11	s	COIL,VARIABLE			
LV181	1-424-371-11	s	COIL			
Q81	8-729-140-96	s	TRANSISTOR	2SD774-34		
Q82	8-729-140-93	s	TRANSISTOR	2SB733-34		
Q83	8-729-199-82	s	TRANSISTOR	2SD998		
Q181	8-729-140-96	s	TRANSISTOR	2SD774-34		
Q182	8-729-140-93	s	TRANSISTOR	2SB733-34		
Q183	8-729-199-82	s	TRANSISTOR	2SD998		
R1	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R2	1-249-417-11	s	CARBON	1K	5%	1/4W
R3	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R4	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R5	1-249-429-11	s	CARBON	10K	5%	1/4W
R6	1-249-408-11	s	CARBON	180	5%	1/4W
R7	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R8	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R10	1-249-393-11	s	CARBON	10	5%	1/4W
R21	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R22	1-249-417-11	s	CARBON	1K	5%	1/4W
R23	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R24	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R25	1-249-429-11	s	CARBON	10K	5%	1/4W
R26	1-249-408-11	s	CARBON	180	5%	1/4W
R27	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R28	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R30	1-249-393-11	s	CARBON	10	5%	1/4W
R41	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R42	1-249-417-11	s	CARBON	1K	5%	1/4W
R43	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R44	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R45	1-249-429-11	s	CARBON	10K	5%	1/4W
R46	1-249-408-11	s	CARBON	180	5%	1/4W
R47	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R48	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R50	1-249-393-11	s	CARBON	10	5%	1/4W
R61	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R62	1-249-417-11	s	CARBON	1K	5%	1/4W
R63	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R64	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R65	1-249-429-11	s	CARBON	10K	5%	1/4W
R66	1-249-408-11	s	CARBON	180	5%	1/4W
R67	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R68	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R70	1-249-393-11	s	CARBON	10	5%	1/4W
R81	1-249-431-11	s	CARBON	15K	5%	1/4W
R82	1-249-399-11	s	CARBON	33	5%	1/4W
R83	1-249-385-11	s	CARBON	2.2	5%	1/4W
R84	1-249-385-11	s	CARBON	2.2	5%	1/4W
R85	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R86	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R87	⚠1-217-638-21	s	FUSIBLE	1.5	5%	1/4W
R88	1-249-429-11	s	CARBON	10K	5%	1/4W
R89	1-249-441-11	s	CARBON	100K	5%	1/4W
R90	1-249-393-11	s	CARBON	10	5%	1/4W
R91	1-249-439-11	s	CARBON	68K	5%	1/4W
R92	1-249-393-11	s	CARBON	10	5%	1/4W
R101	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R102	1-249-417-11	s	CARBON	1K	5%	1/4W
R103	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R104	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R105	1-249-429-11	s	CARBON	10K	5%	1/4W
R106	1-249-408-11	s	CARBON	180	5%	1/4W
R107	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R108	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R110	1-249-393-11	s	CARBON	10	5%	1/4W
R121	1-249-425-11	s	CARBON	4.7K	5%	1/4W

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Ref. No. or Q'ty	Part No.	SP	Description			
R122	1-249-417-11	s	CARBON	1K	5%	1/4W
R123	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R124	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R125	1-249-429-11	s	CARBON	10K	5%	1/4W
R126	1-249-408-11	s	CARBON	180	5%	1/4W
R127	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R128	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R130	1-249-393-11	s	CARBON	10	5%	1/4W
R141	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R142	1-249-417-11	s	CARBON	1K	5%	1/4W
R143	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R144	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R145	1-249-429-11	s	CARBON	10K	5%	1/4W
R146	1-249-408-11	s	CARBON	180	5%	1/4W
R147	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R148	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R150	1-249-393-11	s	CARBON	10	5%	1/4W
R161	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R162	1-249-417-11	s	CARBON	1K	5%	1/4W
R163	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R164	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R165	1-249-429-11	s	CARBON	10K	5%	1/4W
R166	1-249-408-11	s	CARBON	180	5%	1/4W
R167	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R168	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R170	1-249-393-11	s	CARBON	10	5%	1/4W
R181	1-249-431-11	s	CARBON	15K	5%	1/4W
R182	1-249-399-11	s	CARBON	33	5%	1/4W
R183	1-249-385-11	s	CARBON	2.2	5%	1/4W
R184	1-249-385-11	s	CARBON	2.2	5%	1/4W
R185	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R186	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R187	⚠1-217-638-21	s	FUSIBLE	1.5	5%	1/4W
R188	1-249-429-11	s	CARBON	10K	5%	1/4W
R189	1-249-441-11	s	CARBON	100K	5%	1/4W
R190	1-249-393-11	s	CARBON	10	5%	1/4W
R191	1-249-439-11	s	CARBON	68K	5%	1/4W
R192	1-249-393-11	s	CARBON	10	5%	1/4W
RV1	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV21	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV41	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV61	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV101	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV121	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV141	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV161	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RY81	1-515-683-11	s	RELAY			
RY82	1-515-683-11	s	RELAY			
RY181	1-515-683-11	s	RELAY			
RY182	1-515-683-11	s	RELAY			
T81	1-423-952-11	s	TRANSFORMER,BIAS OSCILLATION			
T181	1-423-952-11	s	TRANSFORMER,BIAS OSCILLATION			

AU-198 BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
561	A-8276-824-A	o	MOUNTED CIRCUIT BOARD,AU-198			
C2	1-101-880-00	s	CERAMIC	47pF	5%	50V
C3	1-130-473-00	s	MYLAR	0.0015uF	5%	50V
C4	1-126-163-11	s	ELECT	4.7uF	20%	50V
C5	1-126-301-11	s	ELECT	1uF	20%	50V
C6	1-124-589-11	s	ELECT	47uF	20%	16V
C7	1-124-589-11	s	ELECT	47uF	20%	16V
C8	1-102-961-00	s	CERAMIC	27pF	5%	50V
C9	1-126-301-11	s	ELECT	1uF	20%	50V
C22	1-101-880-00	s	CERAMIC	47pF	5%	50V
C23	1-130-473-00	s	MYLAR	0.0015uF	5%	50V
C24	1-126-163-11	s	ELECT	4.7uF	20%	50V
C25	1-126-301-11	s	ELECT	1uF	20%	50V
C26	1-124-589-11	s	ELECT	47uF	20%	16V
C27	1-124-589-11	s	ELECT	47uF	20%	16V
C28	1-102-961-00	s	CERAMIC	27pF	5%	50V
C29	1-126-301-11	s	ELECT	1uF	20%	50V
C42	1-101-880-00	s	CERAMIC	47pF	5%	50V
C43	1-130-473-00	s	MYLAR	0.0015uF	5%	50V
C44	1-126-163-11	s	ELECT	4.7uF	20%	50V
C45	1-126-301-11	s	ELECT	1uF	20%	50V
C46	1-124-589-11	s	ELECT	47uF	20%	16V
C47	1-124-589-11	s	ELECT	47uF	20%	16V
C48	1-102-961-00	s	CERAMIC	27pF	5%	50V
C49	1-126-301-11	s	ELECT	1uF	20%	50V
C62	1-101-880-00	s	CERAMIC	47pF	5%	50V
C63	1-130-473-00	s	MYLAR	0.0015uF	5%	50V
C64	1-126-163-11	s	ELECT	4.7uF	20%	50V
C65	1-126-301-11	s	ELECT	1uF	20%	50V
C66	1-124-589-11	s	ELECT	47uF	20%	16V
C67	1-124-589-11	s	ELECT	47uF	20%	16V
C68	1-102-961-00	s	CERAMIC	27pF	5%	50V
C69	1-126-301-11	s	ELECT	1uF	20%	50V
C81	1-124-122-11	s	ELECT	100uF	20%	16V
C82	1-124-122-11	s	ELECT	100uF	20%	16V
CN1	1-560-465-00	o	PIN,CONNECTOR	12P		
CN2	1-560-470-00	o	PIN,CONNECTOR	8P		
CN3	1-560-469-00	o	PIN,CONNECTOR	6P		
CN4	1-560-456-00	o	PIN,CONNECTOR	2P		
CN5	1-560-470-00	o	PIN,CONNECTOR	8P		
D41	8-719-911-11	s	DIODE	1SS119		
D71	8-719-911-11	s	DIODE	1SS119		
IC1	8-759-100-06	s	IC	UPC4556C		
IC2	8-759-100-06	s	IC	UPC4556C		
IC41	8-759-100-06	s	IC	UPC4556C		
IC42	8-759-100-06	s	IC	UPC4556C		
Q41	8-729-119-78	s	TRANSISTOR	2SC2785-HFE*(28)		
Q61	8-729-119-78	s	TRANSISTOR	2SC2785-HFE*(28)		
R1	1-249-431-11	s	CARBON	15K	5%	1/4W
R2	1-247-883-00	s	CARBON	150K	5%	1/4W
R3	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R4	1-249-411-11	s	CARBON	330	5%	1/4W
R5	1-249-417-11	s	CARBON	1K	5%	1/4W
R6	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R7	1-249-411-11	s	CARBON	330	5%	1/4W
R8	1-249-429-11	s	CARBON	10K	5%	1/4W
R21	1-249-431-11	s	CARBON	15K	5%	1/4W
R22	1-247-883-00	s	CARBON	150K	5%	1/4W

(AU-198 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description			
R23	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R24	1-249-411-11	s	CARBON	330	5%	1/4W
R25	1-249-417-11	s	CARBON	1K	5%	1/4W
R26	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R27	1-249-411-11	s	CARBON	330	5%	1/4W
R28	1-249-429-11	s	CARBON	10K	5%	1/4W
R41	1-249-431-11	s	CARBON	15K	5%	1/4W
R42	1-247-883-00	s	CARBON	150K	5%	1/4W
R43	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R44	1-249-411-11	s	CARBON	330	5%	1/4W
R45	1-249-417-11	s	CARBON	1K	5%	1/4W
R46	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R47	1-249-411-11	s	CARBON	330	5%	1/4W
R48	1-249-429-11	s	CARBON	10K	5%	1/4W
R49	1-249-429-11	s	CARBON	10K	5%	1/4W
R50	1-249-423-11	s	CARBON	3.3K	5%	1/4W
R51	1-249-441-11	s	CARBON	100K	5%	1/4W
R61	1-249-431-11	s	CARBON	15K	5%	1/4W
R62	1-247-883-00	s	CARBON	150K	5%	1/4W
R63	1-249-421-11	s	CARBON	2.2K	5%	1/4W
R64	1-249-411-11	s	CARBON	330	5%	1/4W
R65	1-249-417-11	s	CARBON	1K	5%	1/4W
R66	⚠1-212-869-00	s	FUSIBLE	33	5%	1/4W
R67	1-249-411-11	s	CARBON	330	5%	1/4W
R68	1-249-429-11	s	CARBON	10K	5%	1/4W
R69	1-249-429-11	s	CARBON	10K	5%	1/4W
R70	1-249-423-11	s	CARBON	3.3K	5%	1/4W
R71	1-249-441-11	s	CARBON	100K	5%	1/4W
RV1	1-230-527-11	s	RES,ADJ,METAL GLAZE	100K		
RV2	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV3	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV21	1-230-527-11	s	RES,ADJ,METAL GLAZE	100K		
RV22	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV23	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV41	1-230-527-11	s	RES,ADJ,METAL GLAZE	100K		
RV42	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV43	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV61	1-230-527-11	s	RES,ADJ,METAL GLAZE	100K		
RV62	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		
RV63	1-230-523-11	s	RES,ADJ,METAL GLAZE	10K		

CN-14(M) BOARD

Ref. No. or Q'ty	Part No.	SP	Description
171	1-634-869-11	o	PRINTED CIRCUIT BOARD,CN-14
CN6	1-562-090-00	s	JACK 13P

EX-357 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
191	1-643-620-11	o	PRINTED CIRCUIT BOARD,EX-357

EX-4 BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
531	1-634-868-11	o	PRINTED CIRCUIT BOARD,EX-4			
C31	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C32	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C33	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C34	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C35	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C36	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C37	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C38	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C39	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C40	1-130-495-00	s	MYLAR	0.1uF	5%	50V
IC1	8-759-231-58	s	IC	TA7812S		
IC2	8-759-701-88	s	IC	NJM7912FA		
IC3	8-759-701-75	s	IC	NJM7805FA		
IC4	8-759-701-75	s	IC	NJM7805FA		
IC7	8-759-231-58	s	IC	TA7812S		

LED-5(M) BOARD

Ref. No. or Q'ty	Part No.	SP	Description
551	1-633-867-13	o	PRINTED CIRCUIT BOARD,LED-5
D1	8-719-313-21	s	LED SEL1321G,GRN

MT-74 BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
541	A-2029-101-A	o	MOUNTED CIRCUIT BOARD,MT-74			
C1	1-102-961-00	s	CERAMIC	27pF	5%	50V
C2	1-124-589-11	s	ELECT	47uF	20%	16V
C3	1-126-301-11	s	ELECT	1uF	20%	50V
C4	1-130-479-00	s	MYLAR	0.0047uF	5%	50V
C5	1-124-589-11	s	ELECT	47uF	20%	16V
C6	1-126-301-11	s	ELECT	1uF	20%	50V
C7	1-126-301-11	s	ELECT	1uF	20%	50V
C21	1-102-961-00	s	CERAMIC	27pF	5%	50V
C22	1-124-589-11	s	ELECT	47uF	20%	16V
C23	1-126-301-11	s	ELECT	1uF	20%	50V
C24	1-130-479-00	s	MYLAR	0.0047uF	5%	50V
C25	1-124-589-11	s	ELECT	47uF	20%	16V
C26	1-126-301-11	s	ELECT	1uF	20%	50V
C27	1-126-301-11	s	ELECT	1uF	20%	50V
C41	1-102-961-00	s	CERAMIC	27pF	5%	50V
C42	1-124-589-11	s	ELECT	47uF	20%	16V
C43	1-126-301-11	s	ELECT	1uF	20%	50V
C44	1-130-479-00	s	MYLAR	0.0047uF	5%	50V
C45	1-124-589-11	s	ELECT	47uF	20%	16V
C46	1-126-301-11	s	ELECT	1uF	20%	50V
C47	1-126-301-11	s	ELECT	1uF	20%	50V
C61	1-102-961-00	s	CERAMIC	27pF	5%	50V
C62	1-124-589-11	s	ELECT	47uF	20%	16V

(MT-74 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description			
C63	1-126-301-11	s	ELECT	1uF	20%	50V
C64	1-130-479-00	s	MYLAR	0.0047uF	5%	50V
C65	1-124-589-11	s	ELECT	47uF	20%	16V
C66	1-126-301-11	s	ELECT	1uF	20%	50V
C67	1-126-301-11	s	ELECT	1uF	20%	50V
CN2	1-560-463-00	o	PIN,CONNECTOR 8P			
D1	8-719-101-61	s	DIODE RD6.2EL2			
D2	8-719-946-39	s	DIODE GL112F9			
D21	8-719-101-61	s	DIODE RD6.2EL2			
D22	8-719-946-39	s	DIODE GL112F9			
D41	8-719-101-61	s	DIODE RD6.2EL2			
D42	8-719-946-39	s	DIODE GL112F9			
D61	8-719-101-61	s	DIODE RD6.2EL2			
D62	8-719-946-39	s	DIODE GL112F9			
IC1	8-759-100-06	s	IC UPC4556C			
IC2	8-759-945-01	s	IC IR2E30			
IC22	8-759-945-01	s	IC IR2E30			
IC41	8-759-100-06	s	IC UPC4556C			
IC42	8-759-945-01	s	IC IR2E30			
IC62	8-759-945-01	s	IC IR2E30			
R1	1-249-429-11	s	CARBON	10K	5%	1/4W
R2	1-249-429-11	s	CARBON	10K	5%	1/4W
R3	⚠ 1-212-869-00	s	FUSIBLE	33	5%	1/4W
R4	1-249-397-11	s	CARBON	22	5%	1/4W
R5	1-249-440-11	s	CARBON	82K	5%	1/4W
R6	1-249-426-11	s	CARBON	5.6K	5%	1/4W
R7	1-249-431-11	s	CARBON	15K	5%	1/4W
R21	1-249-429-11	s	CARBON	10K	5%	1/4W
R22	1-249-429-11	s	CARBON	10K	5%	1/4W
R23	⚠ 1-212-869-00	s	FUSIBLE	33	5%	1/4W
R24	1-249-397-11	s	CARBON	22	5%	1/4W
R25	1-249-440-11	s	CARBON	82K	5%	1/4W
R26	1-249-426-11	s	CARBON	5.6K	5%	1/4W
R27	1-249-431-11	s	CARBON	15K	5%	1/4W
R41	1-249-429-11	s	CARBON	10K	5%	1/4W
R42	1-249-429-11	s	CARBON	10K	5%	1/4W
R43	⚠ 1-212-869-00	s	FUSIBLE	33	5%	1/4W
R44	1-249-397-11	s	CARBON	22	5%	1/4W
R45	1-249-440-11	s	CARBON	82K	5%	1/4W
R46	1-249-426-11	s	CARBON	5.6K	5%	1/4W
R47	1-249-431-11	s	CARBON	15K	5%	1/4W
R61	1-249-429-11	s	CARBON	10K	5%	1/4W
R62	1-249-429-11	s	CARBON	10K	5%	1/4W
R63	⚠ 1-212-869-00	s	FUSIBLE	33	5%	1/4W
R64	1-249-397-11	s	CARBON	22	5%	1/4W
R65	1-249-440-11	s	CARBON	82K	5%	1/4W
R66	1-249-426-11	s	CARBON	5.6K	5%	1/4W
R67	1-249-431-11	s	CARBON	15K	5%	1/4W
R80	1-249-416-11	s	CARBON	820	5%	1/4W
S41	1-554-667-31	s	SWITCH,SLIDE			

SW-7(M) BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
161	1-634-859-11	o	PRINTED CIRCUIT BOARD,SW-7			
CN1	1-560-465-00	o	PIN,CONNECTOR 12P			
D2	8-719-311-21	s	DIODE SEL1121R,RED			
D3	8-719-311-21	s	DIODE SEL1121R,RED			
D4	8-719-311-21	s	DIODE SEL1121R,RED			
D5	8-719-311-21	s	DIODE SEL1121R,RED			
D6	8-719-311-21	s	DIODE SEL1121R,RED			
S1	1-554-937-11	s	SWITCH,PUSH			
S2	1-554-937-11	s	SWITCH,PUSH			
S3	1-554-937-11	s	SWITCH,PUSH			
S4	1-554-937-11	s	SWITCH,PUSH			
S5	1-554-481-00	s	SWITCH,SLIDE			

SY-3(M) BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
521	A-2019-223-A	o	MOUNTED CIRCUIT BOARD,SY-3(M)			
6pcs	⚠ 1-533-189-11	s	HOLDER,FUSE			
BZ501	1-529-069-11	s	BUZZER,PIEZOELECTRICAL			
C1	1-126-256-11	s	ELECT	4700uF	20%	35V
C2	1-126-256-11	s	ELECT	4700uF	20%	35V
C3	1-126-256-11	s	ELECT	4700uF	20%	35V
C4	1-124-360-00	s	ELECT	1000uF	20%	16V
C5	1-124-618-11	s	ELECT	2200uF	20%	35V
C6	1-124-618-11	s	ELECT	2200uF	20%	35V
C7	1-124-618-11	s	ELECT	2200uF	20%	35V
C8	1-124-477-11	s	ELECT	47uF	20%	25V
C9	1-124-477-11	s	ELECT	47uF	20%	25V
C10	1-124-477-11	s	ELECT	47uF	20%	25V
C11	1-124-477-11	s	ELECT	47uF	20%	25V
C12	1-124-477-11	s	ELECT	47uF	20%	25V
C13	1-161-057-00	s	CERAMIC	0.033uF	10%	50V
C14	1-102-962-00	s	CERAMIC	30pF	5%	50V
C15	1-102-962-00	s	CERAMIC	30pF	5%	50V
C16	1-124-477-11	s	ELECT	47uF	20%	25V
C17	1-124-477-11	s	ELECT	47uF	20%	25V
C18	1-124-477-11	s	ELECT	47uF	20%	25V
C19	1-124-477-11	s	ELECT	47uF	20%	25V
C20	1-124-477-11	s	ELECT	47uF	20%	25V
C21	1-161-057-00	s	CERAMIC	0.033uF	10%	50V
C22	1-124-618-11	s	ELECT	2200uF	20%	35V
C23	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C41	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C42	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C51	1-124-618-11	s	ELECT	2200uF	20%	35V
C52	1-124-360-00	s	ELECT	1000uF	20%	16V
C61	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C62	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C101	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C102	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C103	1-124-360-00	s	ELECT	1000uF	20%	16V
C201	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C202	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C203	1-124-360-00	s	ELECT	1000uF	20%	16V

(SY-3(M) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description			
C301	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C302	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C303	1-124-360-00	s	ELECT	1000uF	20%	16V
C401	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C402	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C403	1-124-360-00	s	ELECT	1000uF	20%	16V
CF1	1-567-875-11	s	VIBRATOR,CERAMIC 2.27MHz			
CN1	1-564-242-00	o	PIN,CONNECTOR 5P			
CN2	1-508-736-00	o	PIN,CONNECTOR 10P			
CN4	1-564-320-00	o	PIN,CONNECTOR(B2P-VH) 2P			
CN6	1-560-470-00	o	PIN,CONNECTOR 8P			
CN101	1-560-469-00	o	PIN,CONNECTOR 6P			
CN201	1-560-469-00	o	PIN,CONNECTOR 6P			
CN301	1-560-469-00	o	PIN,CONNECTOR 6P			
CN401	1-560-469-00	o	PIN,CONNECTOR 6P			
CN502	1-560-466-00	o	PIN,CONNECTOR 3P			
D1	8-719-505-60	s	DIODE S5VB60			
D2	8-719-505-60	s	DIODE S5VB60			
D3	8-719-200-02	s	DIODE 10E-2			
D4	8-719-200-02	s	DIODE 10E-2			
D5	8-719-911-19	s	DIODE 1SS119			
D6	8-719-911-19	s	DIODE 1SS119			
D7	8-719-200-02	s	DIODE 10E-2			
D101	8-719-200-02	s	DIODE 10E-2			
D102	8-719-911-19	s	DIODE 1SS119			
D103	8-719-911-19	s	DIODE 1SS119			
D104	8-719-911-19	s	DIODE 1SS119			
D201	8-719-200-02	s	DIODE 10E-2			
D202	8-719-911-19	s	DIODE 1SS119			
D203	8-719-911-19	s	DIODE 1SS119			
D204	8-719-911-19	s	DIODE 1SS119			
D301	8-719-200-02	s	DIODE 10E-2			
D302	8-719-911-19	s	DIODE 1SS119			
D303	8-719-911-19	s	DIODE 1SS119			
D304	8-719-911-19	s	DIODE 1SS119			
D401	8-719-200-02	s	DIODE 10E-2			
D402	8-719-911-19	s	DIODE 1SS119			
D403	8-719-911-19	s	DIODE 1SS119			
D404	8-719-911-19	s	DIODE 1SS119			
D502	8-719-911-19	s	DIODE 1SS119			
D503	8-719-911-19	s	DIODE 1SS119			
D504	8-719-911-19	s	DIODE 1SS119			
D505	8-719-911-19	s	DIODE 1SS119			
IC5	8-759-913-42	s	IC PST520C-2			
IC6	8-759-635-02	s	IC M50747SP-C42SP			
IC8	8-759-701-75	s	IC NJM7805FA			
IC101	8-759-984-03	s	IC LM339N			
IC201	8-759-984-03	s	IC LM339N			
IC301	8-759-984-03	s	IC LM339N			
IC401	8-759-984-03	s	IC LM339N			
PS1	⚠ 1-532-637-11	s	LINK,IC 1.0A			
PS2	⚠ 1-532-679-21	s	LINK,IC 0.6A			
Q1	8-729-900-80	s	TRANSISTOR DTC114ES			
Q2	8-729-199-82	s	TRANSISTOR 2SD998			
Q4	8-729-900-80	s	TRANSISTOR DTC114ES			
Q5	8-729-900-80	s	TRANSISTOR DTC114ES			
Q6	8-729-900-80	s	TRANSISTOR DTC114ES			

Ref. No. or Q'ty	Part No.	SP	Description			
Q102	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q103	8-729-900-61	s	TRANSISTOR DTA114ES			
Q104	8-729-900-61	s	TRANSISTOR DTA114ES			
Q112	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q113	8-729-900-61	s	TRANSISTOR DTA114ES			
Q114	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q121	8-729-900-61	s	TRANSISTOR DTA114ES			
Q122	8-729-140-96	s	TRANSISTOR 2SD774-34			
Q123	8-729-821-04	s	TRANSISTOR 2SA1317-STU			
Q202	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q203	8-729-900-61	s	TRANSISTOR DTA114ES			
Q204	8-729-900-61	s	TRANSISTOR DTA114ES			
Q212	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q213	8-729-900-61	s	TRANSISTOR DTA114ES			
Q214	8-729-900-61	s	TRANSISTOR DTA114ES			
Q221	8-729-900-61	s	TRANSISTOR DTA114ES			
Q222	8-729-140-96	s	TRANSISTOR 2SD774-34			
Q223	8-729-821-04	s	TRANSISTOR 2SA1317-STU			
Q302	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q303	8-729-900-61	s	TRANSISTOR DTA114ES			
Q304	8-729-900-61	s	TRANSISTOR DTA114ES			
Q312	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q313	8-729-900-61	s	TRANSISTOR DTA114ES			
Q314	8-729-900-61	s	TRANSISTOR DTA114ES			
Q321	8-729-900-61	s	TRANSISTOR DTA114ES			
Q322	8-729-140-96	s	TRANSISTOR 2SD774-34			
Q323	8-729-821-04	s	TRANSISTOR 2SA1317-STU			
Q402	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q403	8-729-900-61	s	TRANSISTOR DTA114ES			
Q404	8-729-900-61	s	TRANSISTOR DTA114ES			
Q412	8-729-140-93	s	TRANSISTOR 2SB733-34			
Q413	8-729-900-61	s	TRANSISTOR DTA114ES			
Q414	8-729-900-61	s	TRANSISTOR DTA114ES			
Q421	8-729-900-61	s	TRANSISTOR DTA114ES			
Q422	8-729-140-96	s	TRANSISTOR 2SD774-34			
Q423	8-729-821-04	s	TRANSISTOR 2SA1317-STU			
Q501	8-729-900-80	s	TRANSISTOR DTC114ES			
Q502	8-729-900-61	s	TRANSISTOR DTA114ES			
Q503	8-729-900-61	s	TRANSISTOR DTA114ES			
Q504	8-729-900-61	s	TRANSISTOR DTA114ES			
Q505	8-729-900-61	s	TRANSISTOR DTA114ES			
R1	1-249-441-11	s	CARBON	100K	5%	1/4W
R2	1-249-416-11	s	CARBON	820	5%	1/4W
R3	1-249-416-11	s	CARBON	820	5%	1/4W
R4	1-249-441-11	s	CARBON	100K	5%	1/4W
R5	1-249-429-11	s	CARBON	10K	5%	1/4W
R6	1-249-401-11	s	CARBON	47	5%	1/4W
R7	1-247-903-00	s	CARBON	1M	5%	1/4W
R8	1-249-429-11	s	CARBON	10K	5%	1/4W
R17	1-249-416-11	s	CARBON	820	5%	1/4W
R18	1-249-416-11	s	CARBON	820	5%	1/4W
R19	1-249-416-11	s	CARBON	820	5%	1/4W
R22	1-249-441-11	s	CARBON	100K	5%	1/4W
R102	1-249-417-11	s	CARBON	1K	5%	1/4W
R104	1-249-429-11	s	CARBON	10K	5%	1/4W
R105	1-249-396-11	s	CARBON	18	5%	1/4w
R112	1-249-417-11	s	CARBON	1K	5%	1/4W
R114	1-249-429-11	s	CARBON	10K	5%	1/4W
R115	1-249-416-11	s	CARBON	820	5%	1/4W

(SY-3(M) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description			
R116	1-249-429-11	s	CARBON	10K	5%	1/4W
R117	1-249-401-11	s	CARBON	47	5%	1/4W
R122	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R202	1-249-417-11	s	CARBON	1K	5%	1/4W
R204	1-249-429-11	s	CARBON	10K	5%	1/4W
R205	1-249-396-11	s	CARBON	18	5%	1/4w
R212	1-249-417-11	s	CARBON	1K	5%	1/4W
R214	1-249-429-11	s	CARBON	10K	5%	1/4W
R215	1-249-416-11	s	CARBON	820	5%	1/4W
R216	1-249-429-11	s	CARBON	10K	5%	1/4W
R217	1-249-401-11	s	CARBON	47	5%	1/4W
R222	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R302	1-249-417-11	s	CARBON	1K	5%	1/4W
R304	1-249-429-11	s	CARBON	10K	5%	1/4W
R305	1-249-396-11	s	CARBON	18	5%	1/4w
R312	1-249-417-11	s	CARBON	1K	5%	1/4W
R314	1-249-429-11	s	CARBON	10K	5%	1/4W
R315	1-249-416-11	s	CARBON	820	5%	1/4W
R316	1-249-429-11	s	CARBON	10K	5%	1/4W
R317	1-249-401-11	s	CARBON	47	5%	1/4W
R322	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R402	1-249-417-11	s	CARBON	1K	5%	1/4W
R404	1-249-429-11	s	CARBON	10K	5%	1/4W
R405	1-249-396-11	s	CARBON	18	5%	1/4w
R412	1-249-417-11	s	CARBON	1K	5%	1/4W
R414	1-249-429-11	s	CARBON	10K	5%	1/4W
R415	1-249-416-11	s	CARBON	820	5%	1/4W
R416	1-249-429-11	s	CARBON	10K	5%	1/4W
R417	1-249-401-11	s	CARBON	47	5%	1/4W
R422	1-249-425-11	s	CARBON	4.7K	5%	1/4W
R501	1-249-249-11	s	CARBON	10K	5%	1/4W
R502	1-249-413-11	s	CARBON	470	5%	1/4W
R503	1-249-413-11	s	CARBON	470	5%	1/4w
R504	1-249-413-11	s	CARBON	470	5%	1/4W
R505	1-249-413-11	s	CARBON	470	5%	1/4W
R506	1-249-416-11	s	CARBON	820	5%	1/4W
R507	1-249-416-11	s	CARBON	820	5%	1/4W
R508	1-249-249-11	s	CARBON	10K	5%	1/4W
R509	1-249-416-11	s	CARBON	820	5%	1/4W
R510	1-249-416-11	s	CARBON	820	5%	1/4W
RB1	1-235-195-00	s	RES BLOCK	10Kx8		
RB2	1-235-195-00	s	RES BLOCK	10Kx8		
RB3	1-231-533-00	s	RESISTOR BLOCK	10Kx4		

VR-148 BOARD

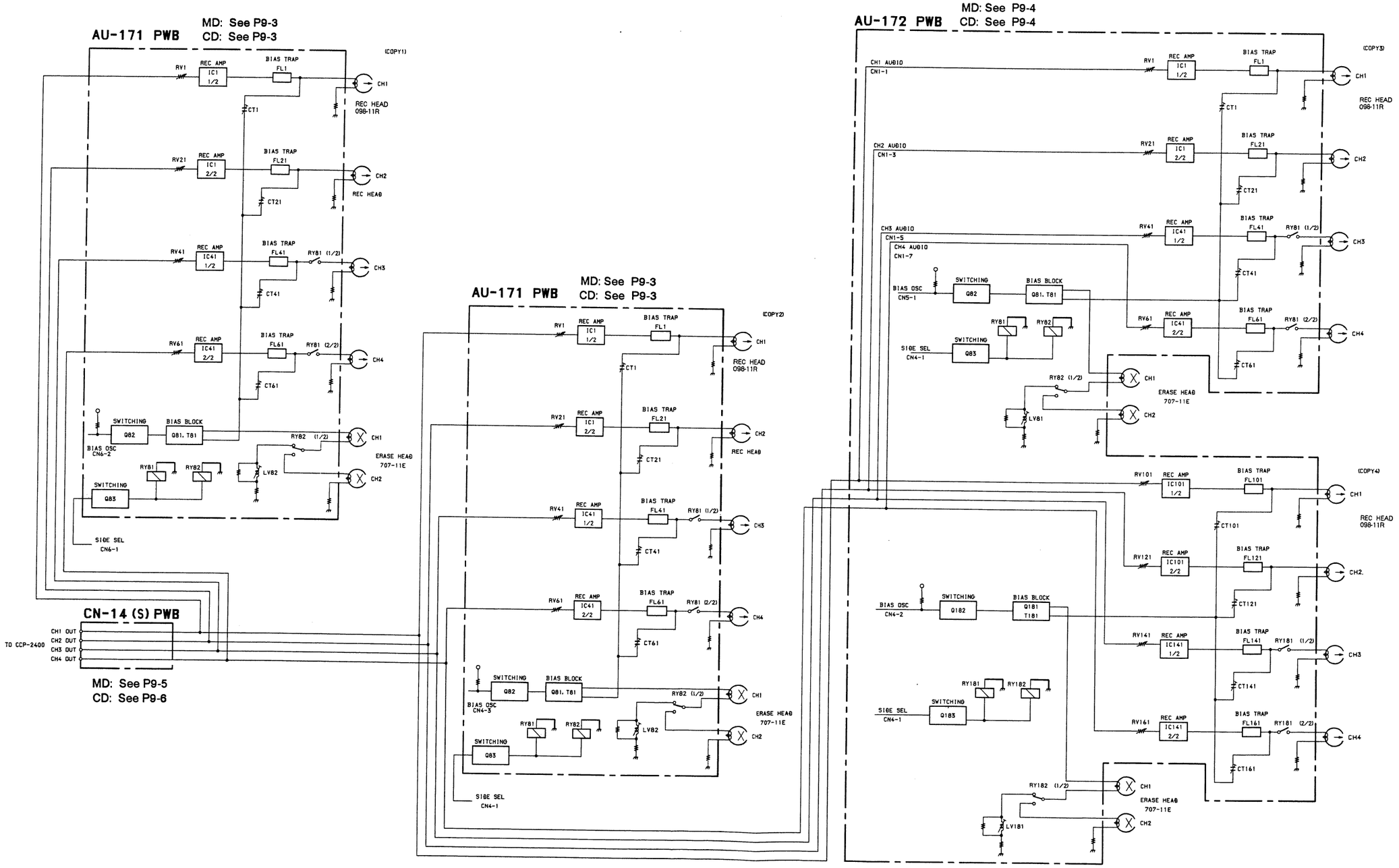
Ref. No. or Q'ty	Part No.	SP	Description
181	1-643-619-11	o	PRINTED CIRCUIT BOARD,VR-148
RV1	1-241-059-11	s	RES,VAR,CARBON 10K

FRAME

Ref. No. or Q'ty	Part No.	SP	Description
102	1-541-747-21	s	MOTOR,CAPSTAN
103	1-500-097-11	s	HEAD,MAGNETIC(PLAYBACK) 097-11P
104	1-500-098-11	s	HEAD,MAGNETIC(RECORD) 098-11R
105	1-543-707-11	s	ERASE HEAD 707-11E
F1	⚠1-532-745-11	s	FUSE,GLASS TUBE 3.15A 125V (FOR J,U MODEL ONLY)
	⚠1-532-237-00	s	FUSE,TIME-LAG(BET) 3.15A 250V (FOR EK MODEL ONLY)
F2	⚠1-532-744-11	s	FUSE,GLASS TUBE 2.5A 125V (FOR J,U MODEL ONLY)
	⚠1-532-286-00	s	FUSE,TIME-LAG(BET) 2.5A 250V (FOR EK MODEL ONLY)
F3	⚠1-532-744-11	s	FUSE,GLASS TUBE 2.5A 125V (FOR J,U MODEL ONLY)
	⚠1-532-286-00	s	FUSE,TIME-LAG(BET) 2.5A 250V (FOR EK MODEL ONLY)
M100	1-543-163-51	s	MOTOR 163-51(RF-510T)
M200	1-543-163-51	s	MOTOR 163-51(RF-510T)
M300	1-543-163-51	s	MOTOR 163-51(RF-510T)
M400	1-543-163-51	s	MOTOR 163-51(RF-510T)
M110	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
M210	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
M310	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
M410	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
PM100	1-454-495-11	s	SOLENOID,PLUNGER
PM200	1-454-495-11	s	SOLENOID,PLUNGER
PM300	1-454-495-11	s	SOLENOID,PLUNGER
PM400	1-454-495-11	s	SOLENOID,PLUNGER
S1	⚠1-570-744-21	s	SWITCH,AC POWER
T1	⚠1-449-928-11	s	TRANSFORMER,POWER (FOR J,U MODEL ONLY)
	⚠1-450-145-11	s	TRANSFORMER,POWER (FOR EK MODEL ONLY)
	1-751-808-11	o	CABLE, CONNECTION 12P(FOR PLAYBACK HEAD)
	1-690-979-11	o	CABLE, CONNECTION 12P(FOR RECORD HEAD)

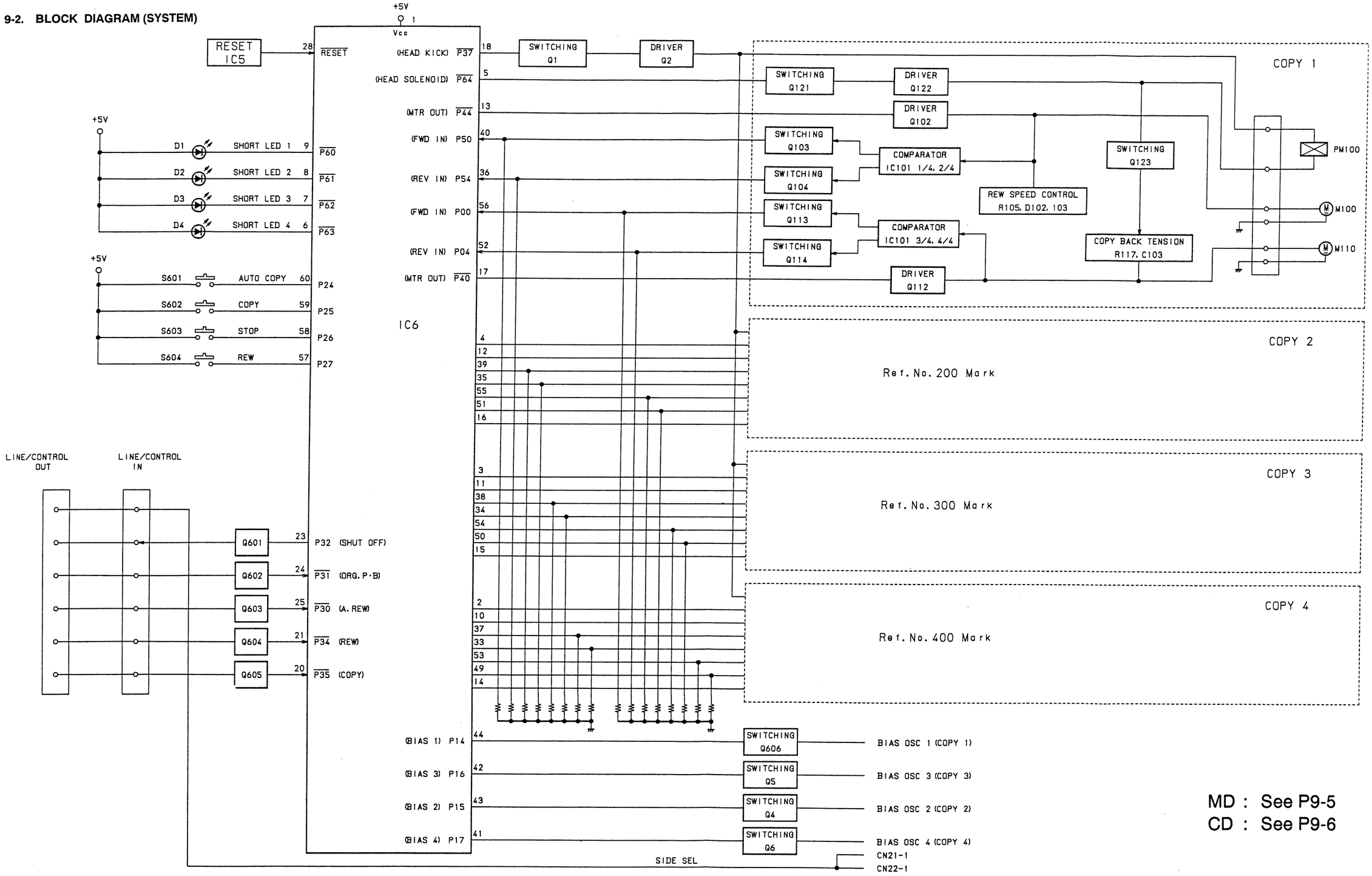
SECTION 9
CCP-2410F DIAGRAMS

9-1. BLOCK DIAGRAM (AUDIO)



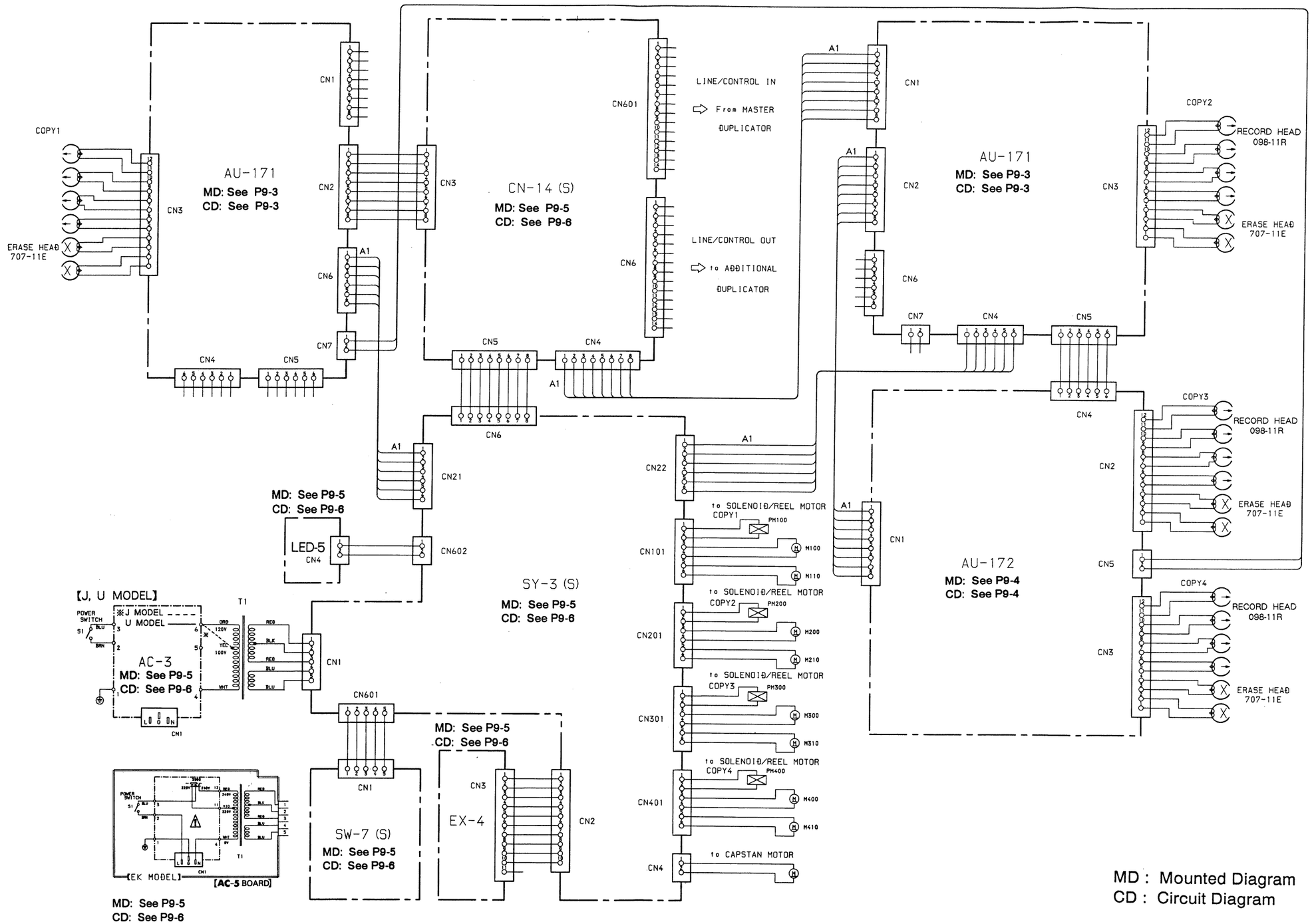
MD : Mounted Diagram
CD : Circuit Diagram

9-2. BLOCK DIAGRAM (SYSTEM)



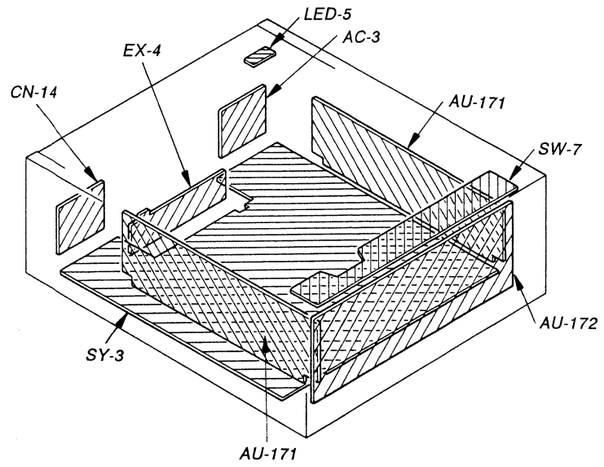
MD : See P9-5
CD : See P9-6

9-3. FRAME WIRING



MD : Mounted Diagram
CD : Circuit Diagram

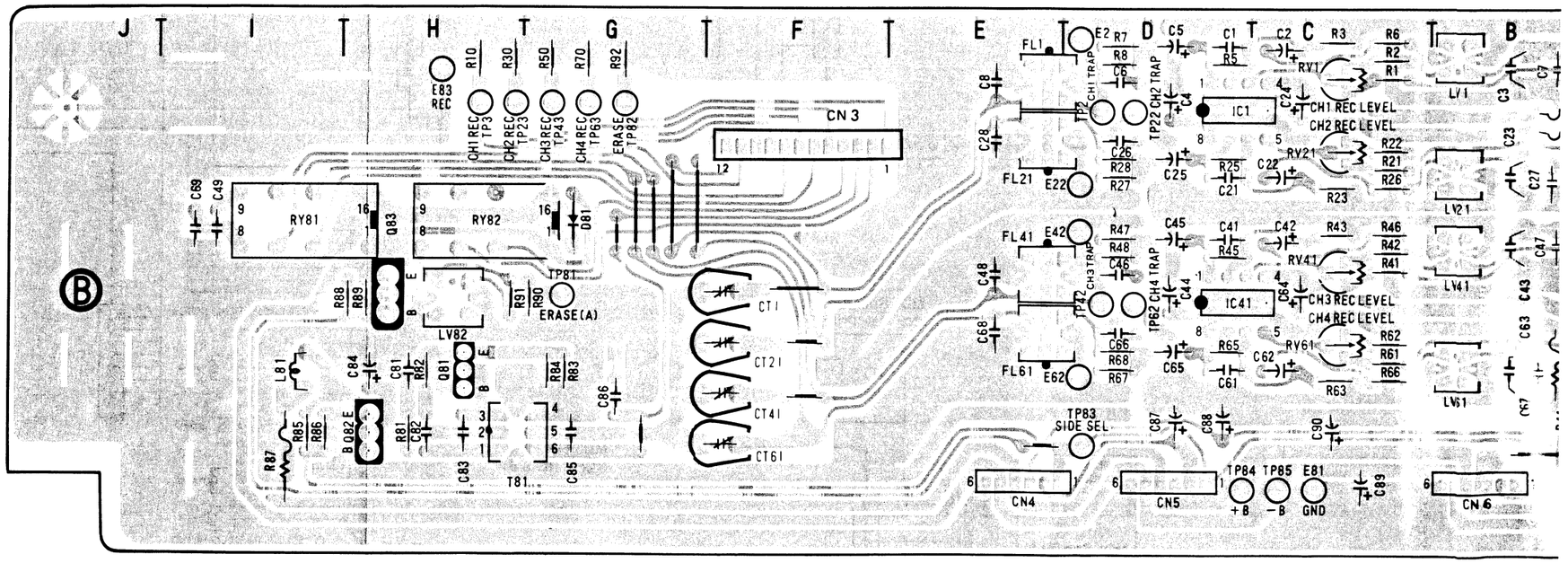
9-4. LOCATION OF THE PRINTED WIRING BOARD



9-5. AU-171 BOARD – *Soldering Side* –

AU-171

CN1	A-2	E2	D-1	LV61	B-3	RV21	C-1	TP62	D-2
CN2	A-2	E22	E-1	LV82	H-2	RV41	C-2	TP63	G-1
CN3	F-1	E41	B-2			RV61	C-2	TP81	G-2
CN4	E-3	E42	E-2	Q81	H-3			TP82	G-1
CN5	D-3	E62	E-3	Q82	H-3	TP1	B-1	TP83	D-3
CN6	B-3	E81	C-3	Q83	H-2	TP2	D-1	TP84	C-3
CN7	B-3	E83	H-1			TP3	H-1	TP85	C-3
				R4	B-1	TP21	B-1		
CT1	F-2	IC1	D-1	R24	B-1	TP22	D-1	FL1	E-1
CT21	F-2	IC41	D-2	R44	B-3	TP23	H-1	FL21	E-1
CT41	F-3			R64	B-3	TP41	B-2	FL41	E-2
CT61	F-3	LV1	B-1	R87	I-3	TP42	D-2	FL61	E-2
		LV21	B-1			TP43	G-1		
D81	G-2	LV41	B-2	RV1	C-1	TP61	B-2		



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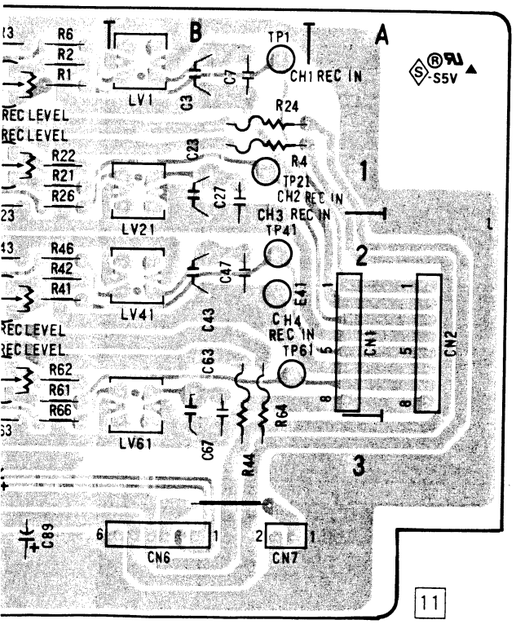
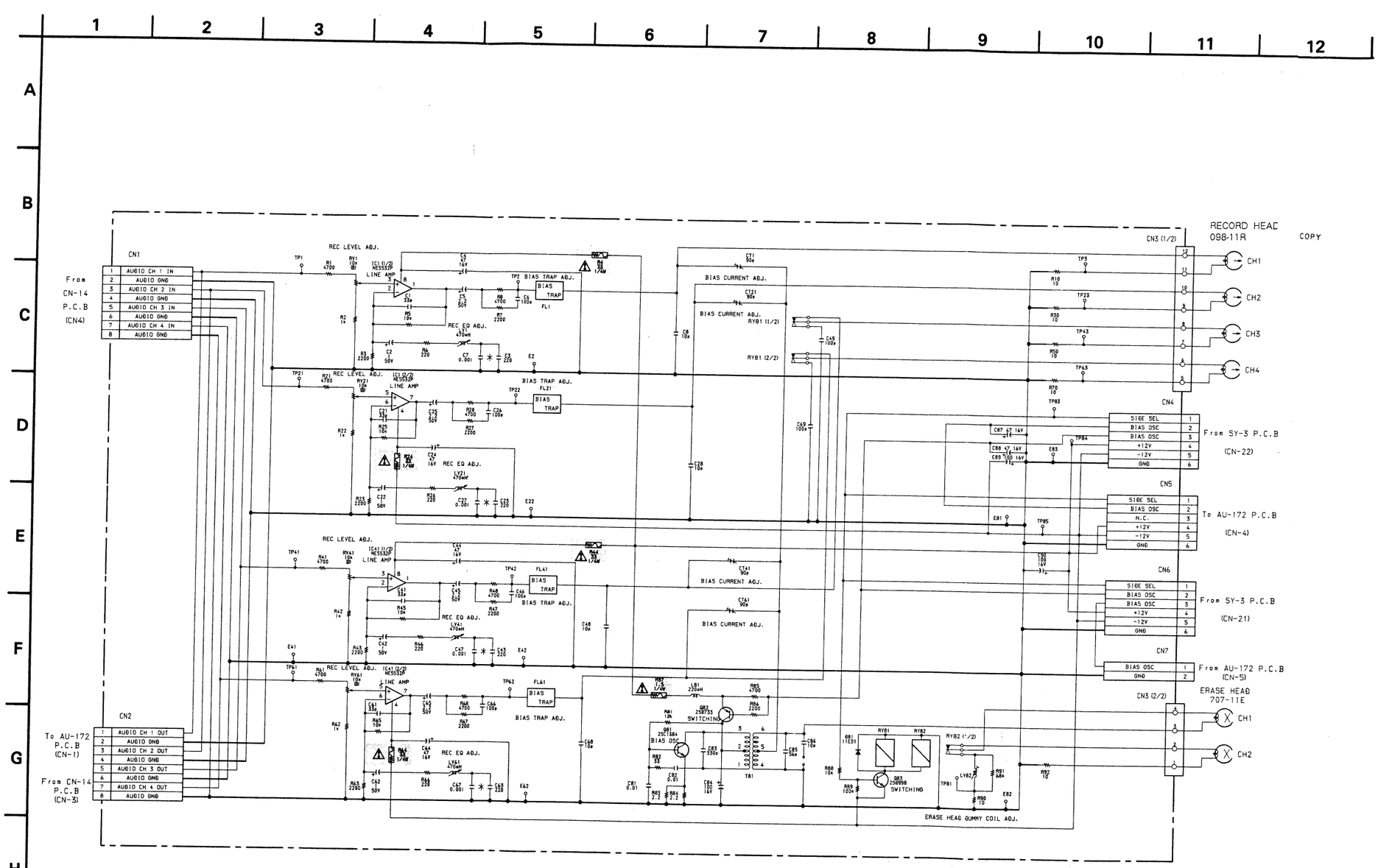


AU-171 BOARD
BOARD No. 1-643-616-11



注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ⚠はヒューズ抵抗。
- ＊印部品は可変の調整部品です。

⚠および　　印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

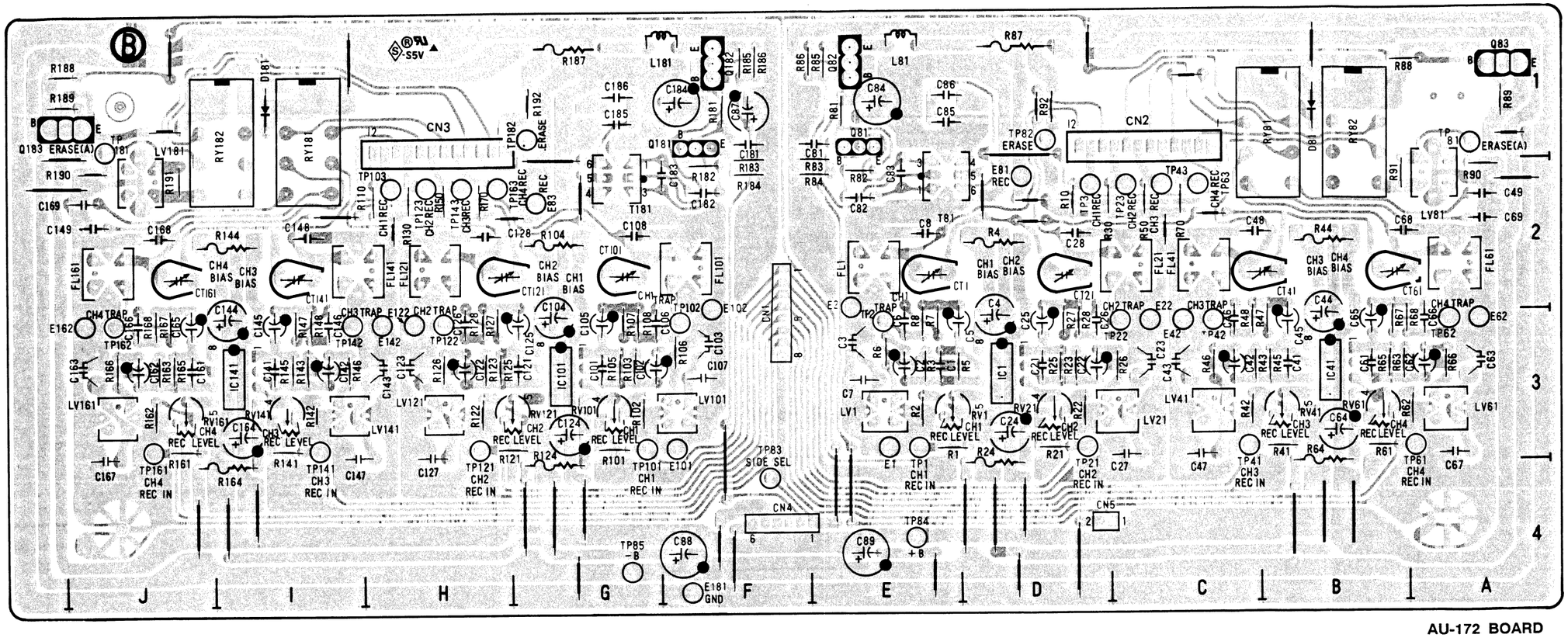
AU-171 BOARD
BOARD No. 1-643-616-11

Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⚠ : fusible resistor.
- "＊" mark parts are adjustment parts they have varied value.

Note: The components identified by shading and mar ⚠ are critical for safety. Replace only with pa number specified.

9-6. AU-172 BOARD – Soldering Side –

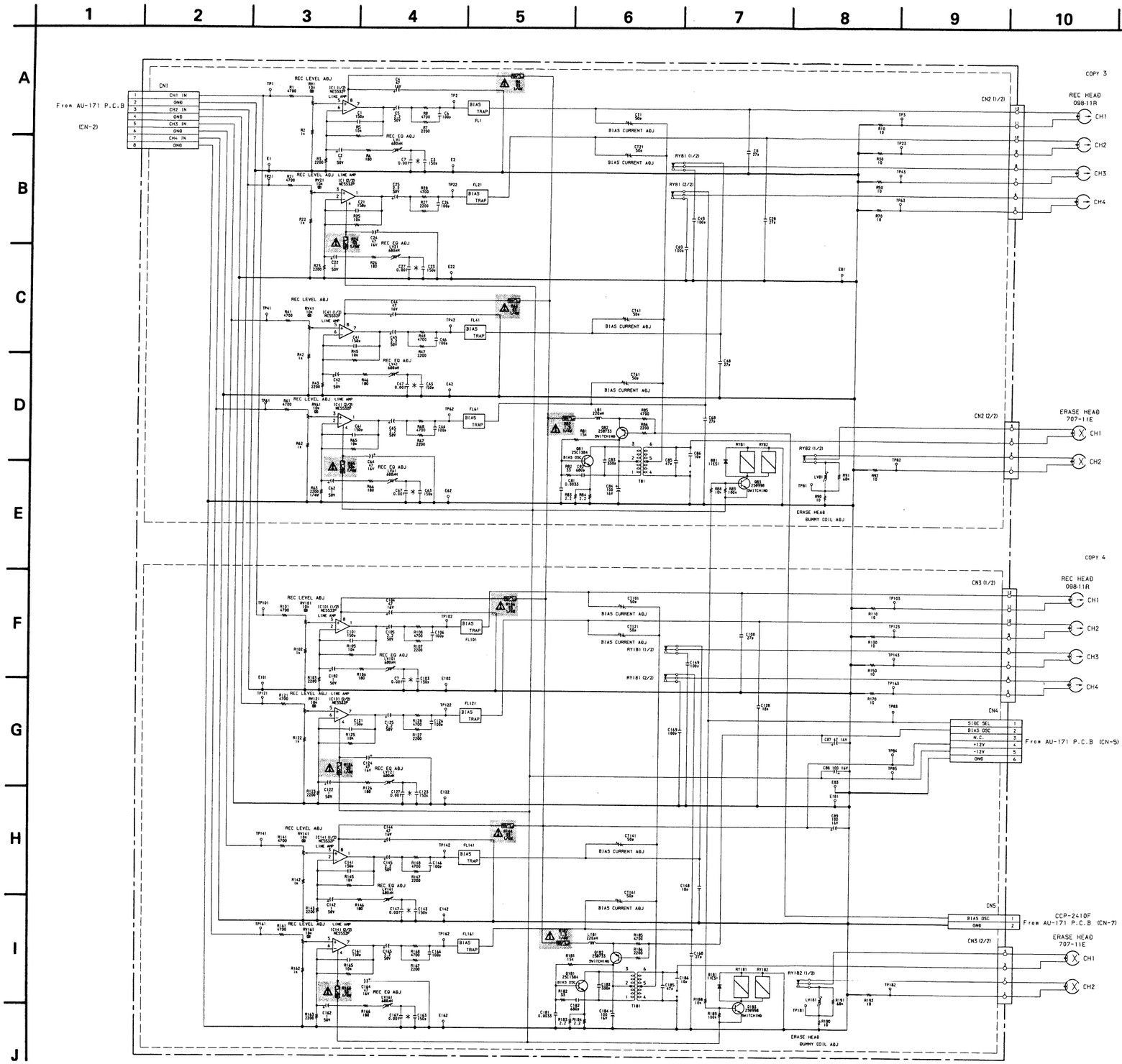


11

AU-172 BOARD
BOARD No. 1-643-617-11

AU-172

CN1	F-3	E81	D-2	LV1	E-3	R104	G-2	TP43	C-2
CN2	C-1	E83	G-2	LV21	C-3	R124	G-3	TP61	A-3
CN3	H-1	E101	F-3	LV41	C-3	R144	I-2	TP62	A-3
CN4	F-4	E102	F-3	LV61	A-3	R164	I-4	TP63	C-2
CN5	D-4	E122	H-3	LV81	A-2	R187	G-1	TP81	A-1
		E142	H-3	LV101	F-3			TP82	D-1
CT1	E-2	E162	J-3	LV121	H-3	RV1	D-3	TP83	F-4
CT21	D-2	E181	F-4	LV141	H-3	RV21	D-3	TP84	E-4
CT41	B-2			LV161	J-3	RV41	B-3	TP85	G-4
CT61	B-2	FL1	E-2	LV181	J-1	RV61	B-3	TP101	G-3
CT101	G-2	FL21	C-2			RV101	G-3	TP102	F-3
CT121	G-2	FL41	C-2	Q81	E-1	RV121	G-3	TP103	H-2
CT141	I-2	FL61	A-2	Q82	E-1	RV141	I-3	TP121	H-3
CT161	J-2	FL101	F-2	Q83	A-1	RV161	J-3	TP122	H-3
		FL121	H-2	Q181	F-1			TP123	H-2
D81	B-1	FL141	H-2	Q182	F-1	TP1	E-3	TP141	I-3
D181	I-1	FL161	J-2	Q183	J-1	TP2	E-3	TP142	I-3
						TP3	D-2	TP143	H-2
E1	E-3	IC1	D-3	R4	D-2	TP21	D-3	TP161	J-3
E2	E-2	IC41	B-3	R24	D-3	TP22	C-3	TP162	J-3
E22	C-3	IC101	G-3	R44	B-2	TP23	C-2	TP163	H-2
E42	C-3	IC141	I-3	R64	B-3	TP41	C-3	TP181	J-1
E62	A-3			R87	D-1	TP42	C-3	TP182	G-1



AU-172 BOARD
BOARD No. 1-643-617-11

注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ⏦はヒューズ抵抗。
- ＊印部品は可変の調整部品です。

⚠および▨印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

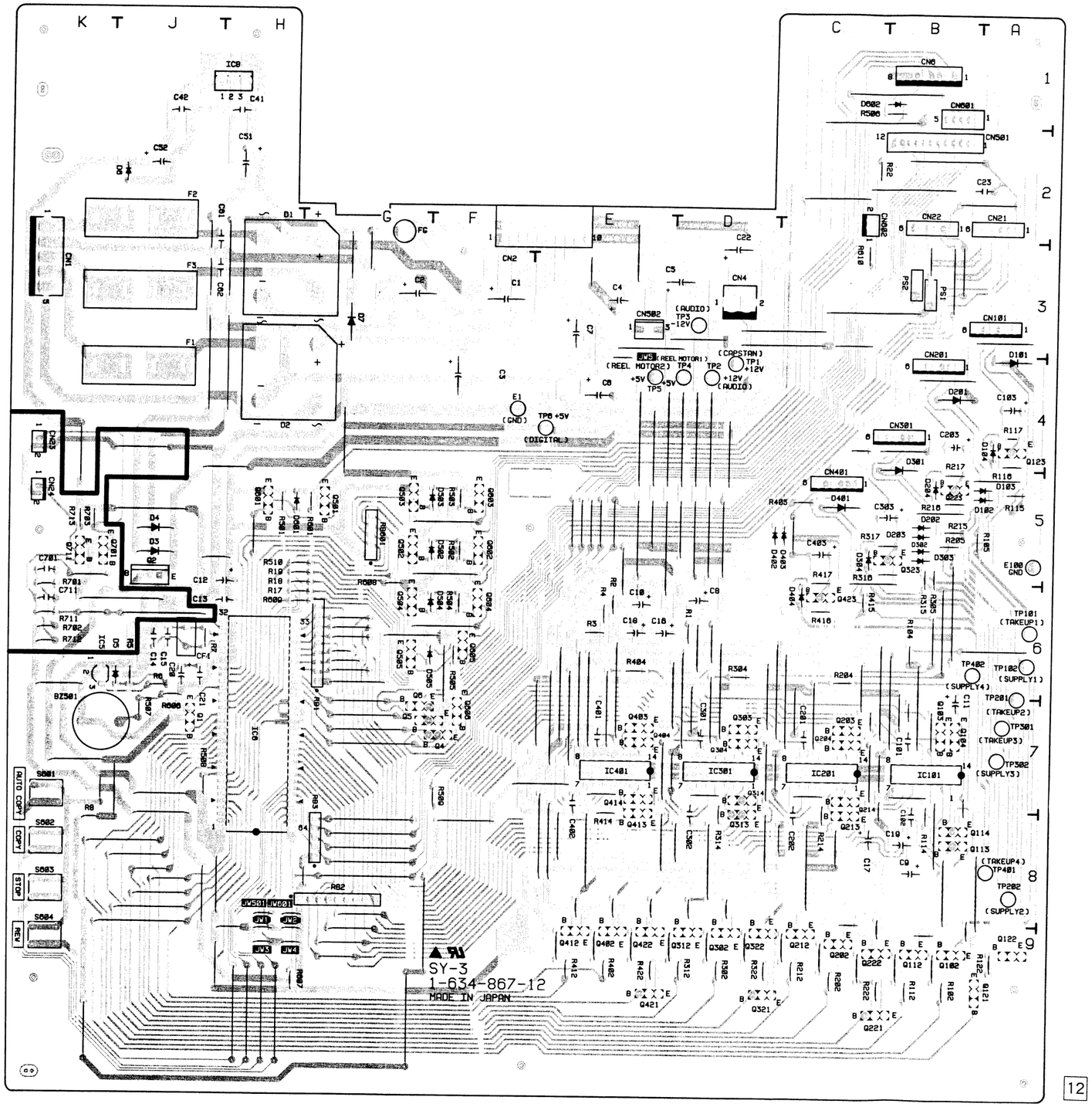
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ⏦ : fusible resistor.
- " ＊ " mark parts are adjustment parts they have varied value.

Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

9-7. SY-3 (S), EX-4, CN-14 (S), AC-3, AC-5 SW-7 (S), LED-5 BOARDS – *Soldering Side* -

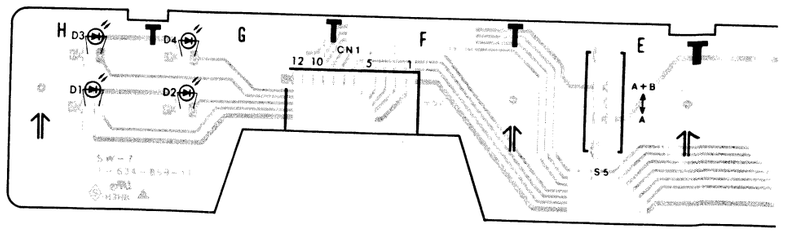
SY-3 (S) BOARD



SY-3(S)

CN1	K-3	D201	B-4	IC8	H-1	Q203	C-7	Q422	E-9	TP301	A
CN2	F-2	D202	B-5	IC101	B-7	Q204	C-7	Q423	C-6	TP302	A
CN4	D-3	D203	B-5	IC201	C-7	Q212	C-9	Q601	H-5	TP401	A
CN6	B-1	D204	B-5	IC301	D-7	Q213	C-8	Q602	F-5	TP402	A
CN21	A-2	D301	B-4	IC401	E-7	Q214	C-7	Q603	F-5		
CN22	B-2	D302	B-5			Q221	B-9	Q604	F-6		
CN101	A-3	D303	B-5	PS1	B-3	Q222	C-9	Q605	F-6		
CN201	B-4	D304	C-5	PS2	B-3	Q223	B-5	Q606	F-7		
CN301	B-4	D401	C-5			Q302	D-9				
CN401	C-5	D402	D-5	Q1	J-7	Q303	D-7	S601	K-7		
CN601	B-1	D403	C-5	Q2	J-6	Q304	D-7	S602	K-8		
CN602	C-2	D404	C-6	Q4	F-7	Q312	D-9	S603	K-8		
		D601	H-5	Q5	F-7	Q313	D-8	S604	K-9		
D1	H-3	D602	B-1	Q6	F-7	Q314	D-7				
D2	H-4			Q102	B-9	Q321	D-9	TP1	D-4		
D3	J-5	E1	F-4	Q103	B-7	Q322	D-9	TP2	D-4		
D4	J-5	E100	A-5	Q104	A-7	Q323	B-5	TP3	D-3		
D5	J-6			Q112	B-9	Q402	E-9	TP4	D-4		
D6	J-2	F1	J-4	Q113	B-8	Q403	E-7	TP5	E-4		
D7	G-3	F2	J-2	Q114	B-8	Q404	E-7	TP6	E-4		
D101	A-4	F3	J-3	Q121	A-9	Q412	E-9	TP101	A-6		
D102	A-5			Q122	A-9	Q413	E-8	TP102	A-6		
D103	A-5	IC5	K-6	Q123	A-4	Q414	E-7	TP201	A-6		
D104	A-4	IC6	H-7	Q202	C-9	Q421	E-9	TP202	A-8		

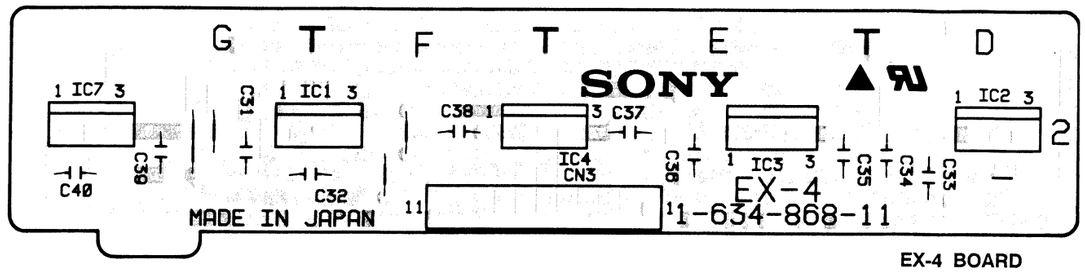
SW-7 (S) BOARD



SY-3 (S) BOARD
BOARD No. 1-634-867-12

Q422	E-9	TP301	A-7
Q423	C-6	TP302	A-7
Q601	H-5	TP401	A-8
Q602	F-5	TP402	A-6
Q603	F-5		
Q604	F-6		
Q605	F-6		
Q606	F-7		
S601	K-7		
S602	K-8		
S603	K-8		
S604	K-9		
TP1	D-4		
TP2	D-4		
TP3	D-3		
TP4	D-4		
TP5	E-4		
TP6	E-4		
TP101	A-6		
TP102	A-6		
TP201	A-6		
TP202	A-8		

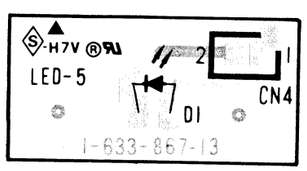
EX-4 BOARD



11

EX-4 BOARD
BOARD No. 1-634-868-11

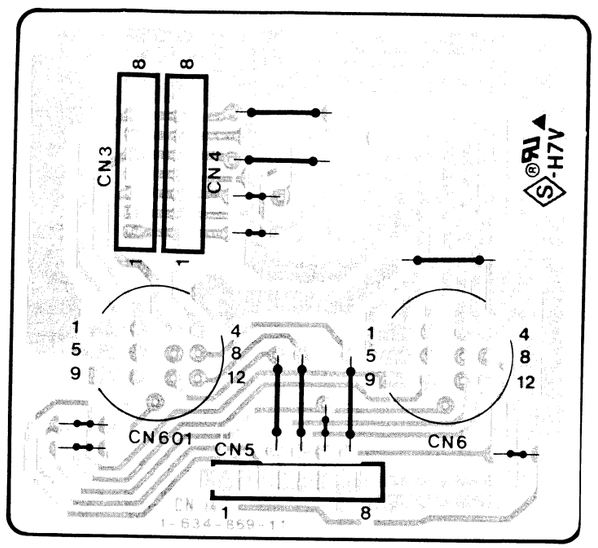
LED-5 BOARD



13

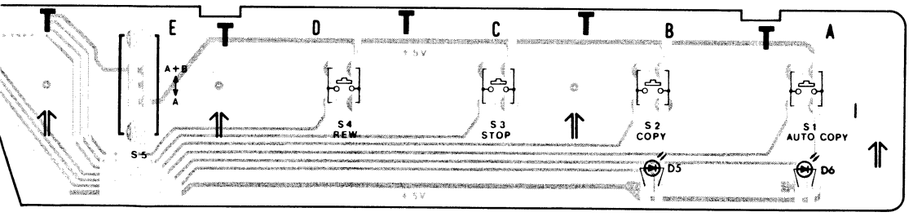
LED-5 BOARD
BOARD No. 1-633-867-13

CN-14 (S) BOARD



11

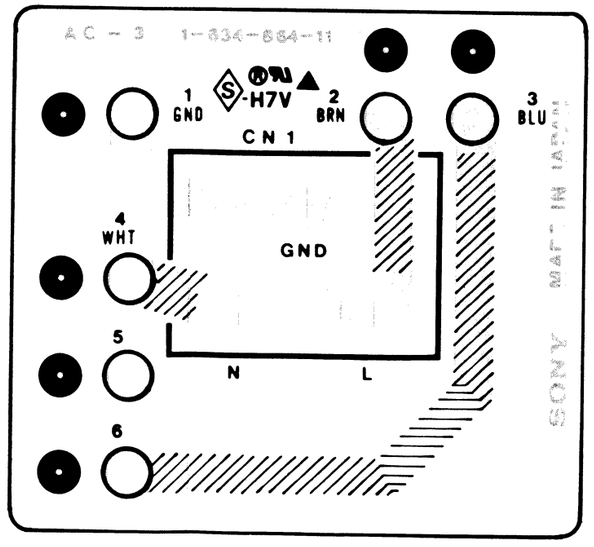
CN-14 (S) BOARD
BOARD No. 1-634-869-11



SW-7 (S) BOARD
BOARD No. 1-634-859-11

11

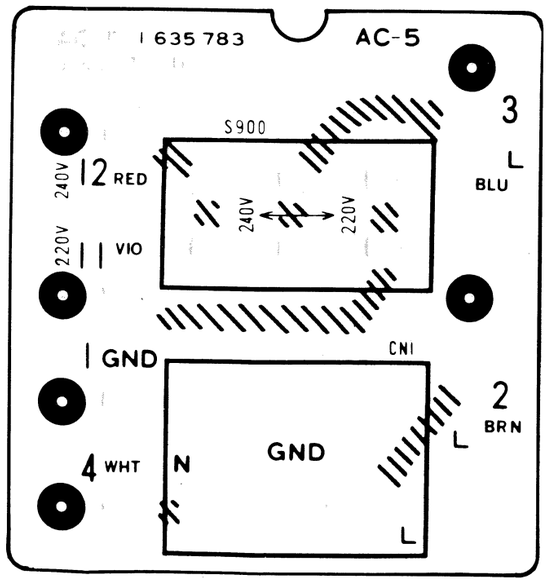
AC-3 BOARD



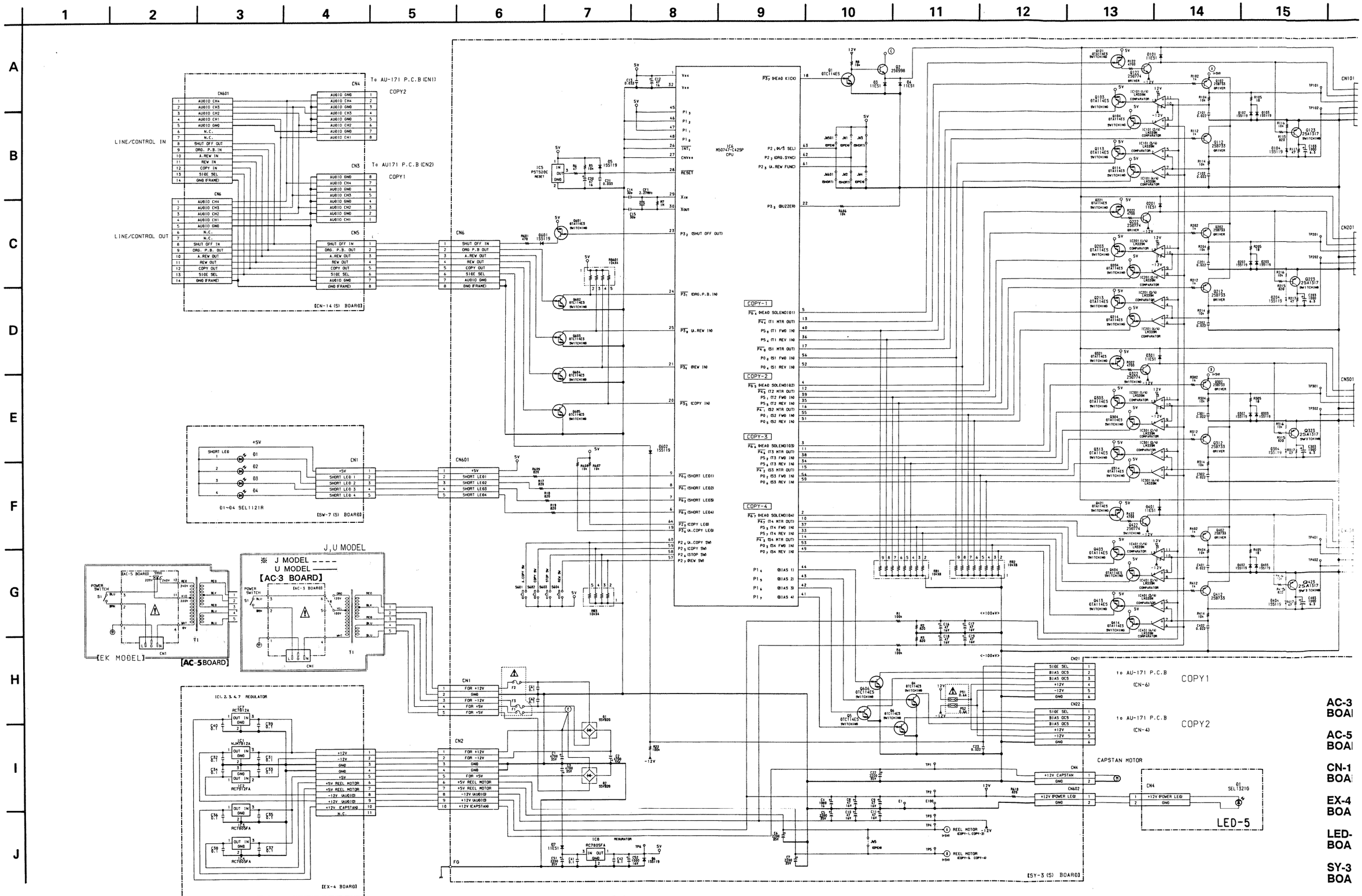
11

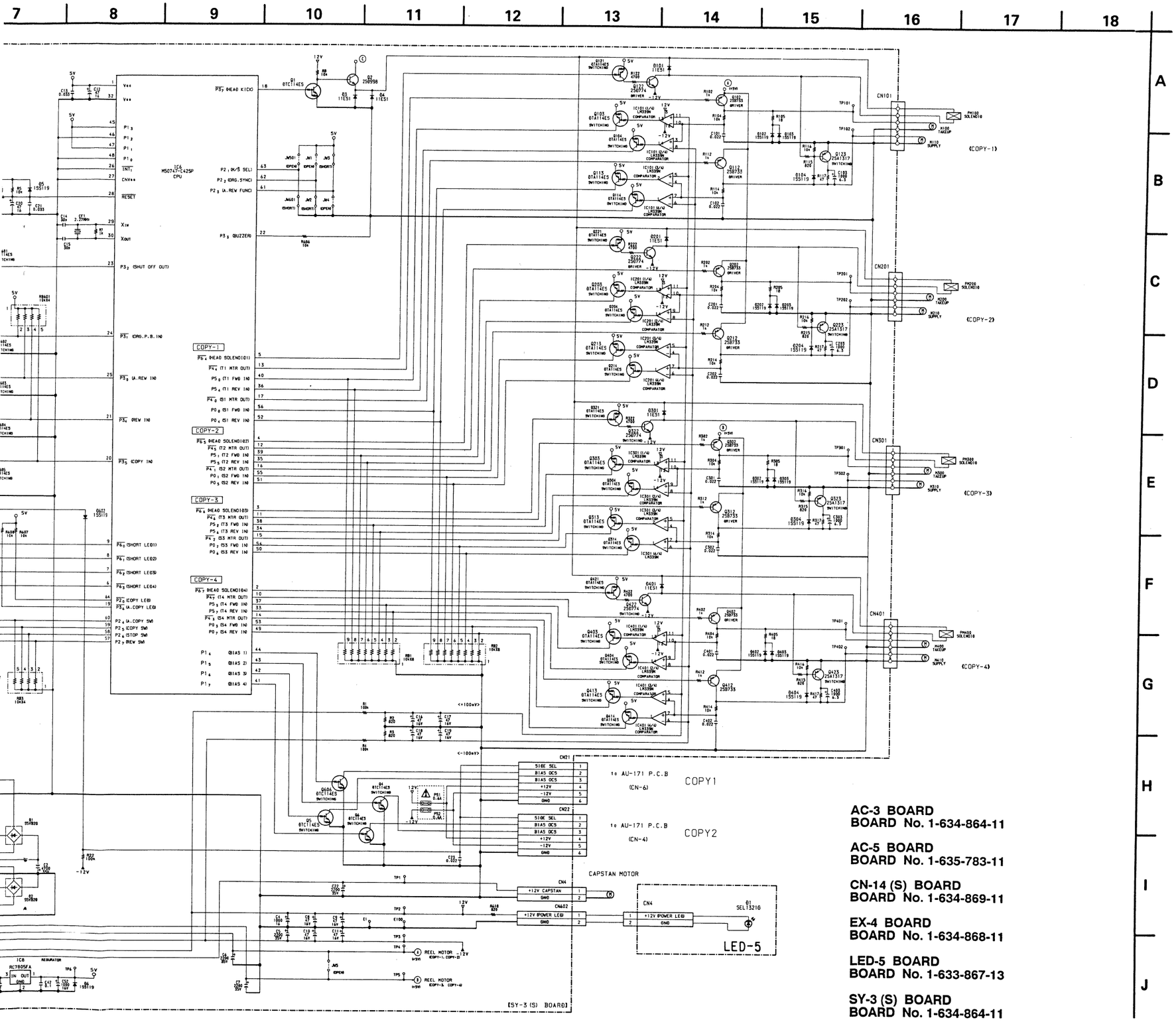
AC-3 BOARD
BOARD No. 1-634-864-11

AC-5 BOARD (EK MODEL)



AC-5 BOARD
BOARD No. 1-635-783-11


To AU-171 P.C.B (CN1)
COPY2
To AU171 P.C.B (CN2)
COPY1
LINE/CONTROL IN
LINE/CONTROL OUT
[CN-14 (S) BOARD]
[SW-7 (S) BOARD]
D1~D4 SEL1121R
J,U MODEL
※ J MODEL ----
U MODEL ——
[AC-3 BOARD]
[EK MODEL]
[AC-5BOARD]
[EX-4 BOARD]
[SY-3 (S) BOARD]
IC1, 2, 3, 4, 7 REGULATOR
IC8 REGULATOR
IC4 M50747-042SP CPU
IC5 PST520C RESET
to AU-171 P.C.B (CN-6) COPY1
to AU-171 P.C.B (CN-4) COPY2
CAPSTAN MOTOR
REEL MOTOR -12V (COPY-1, COPY-2)
REEL MOTOR (COPY-3, COPY-4)
LED-5
COPY-1
COPY-2
COPY-3
COPY-4
AC-3 BOAI
AC-5 BOAI
CN-1 BOAI
EX-4 BOA
LED- BOA
SY-3 BOA



AC-3 BOARD
BOARD No. 1-634-864-11

AC-5 BOARD
BOARD No. 1-635-783-11

CN-14 (S) BOARD
BOARD No. 1-634-869-11

EX-4 BOARD
BOARD No. 1-634-868-11

LED-5 BOARD
BOARD No. 1-633-867-13

SY-3 (S) BOARD
BOARD No. 1-634-864-11

注意

- ケミコン，タンタルを除くコンデンサで，耐圧50V以下のものは，その耐圧を省略。単位はすべてμF（pはpF）。
- 抵抗で指示のないものは¼W。単位はすべてΩ。
- ▭ はヒューズ抵抗。

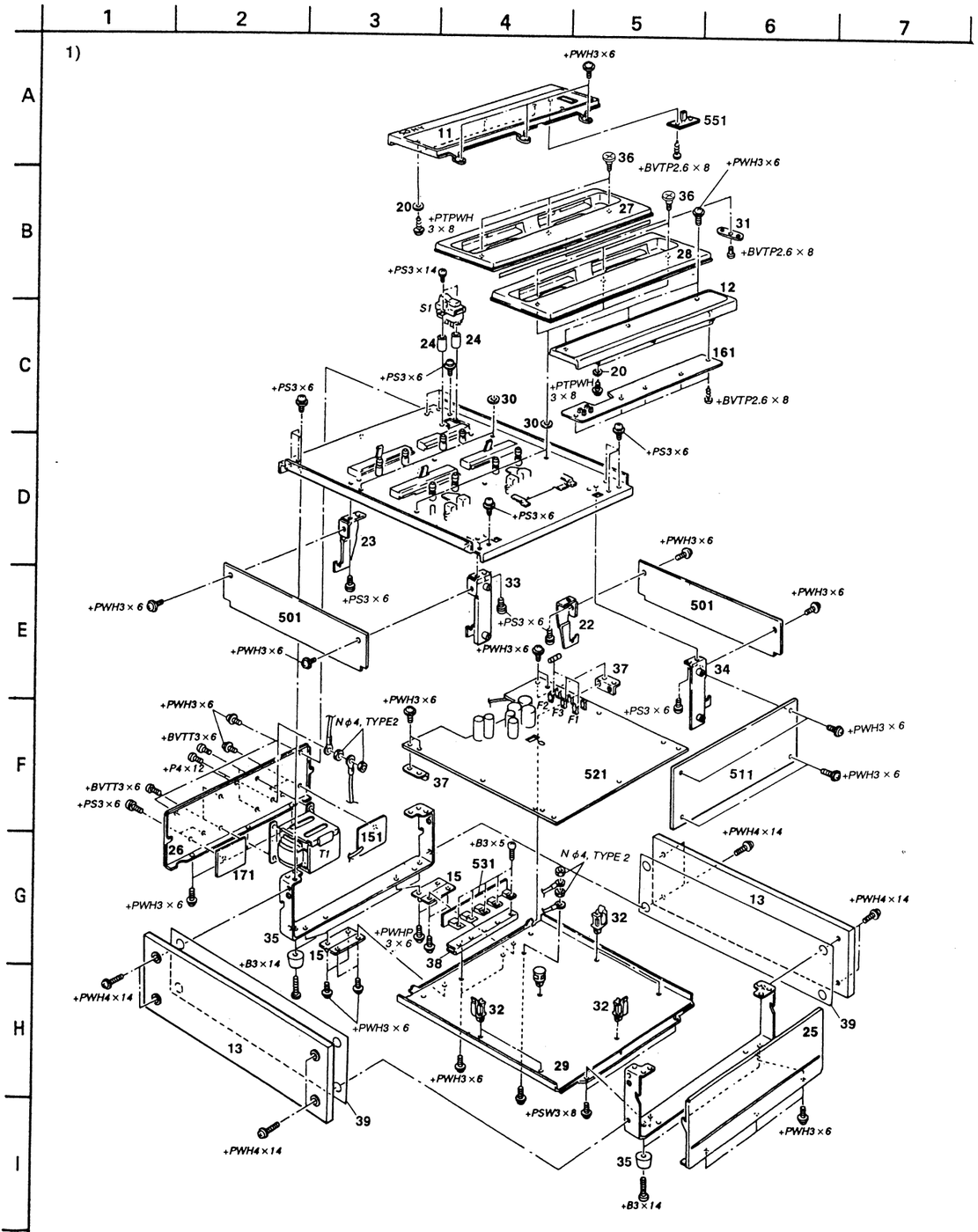
⚠および▨印の部品は，安全性を維持するために，重要な部品です。従って交換時は，必ず指定の部品を使用してください。

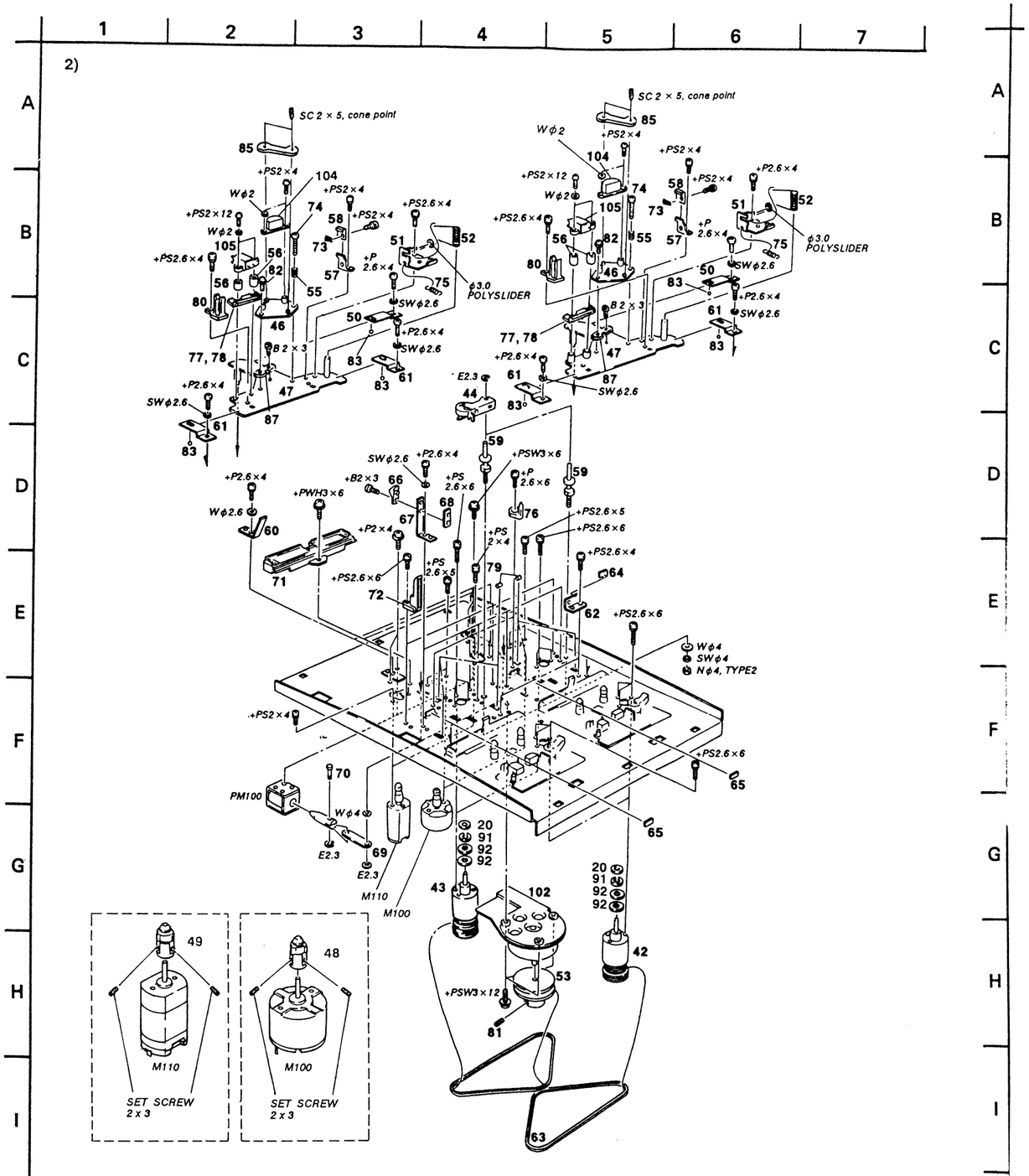
Note:

- All capacitors are in μF unless otherwise noted. pF: μμF 50 WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in Ω and ¼ W or less unless otherwise specified.
- ▭ : fusible resistor.

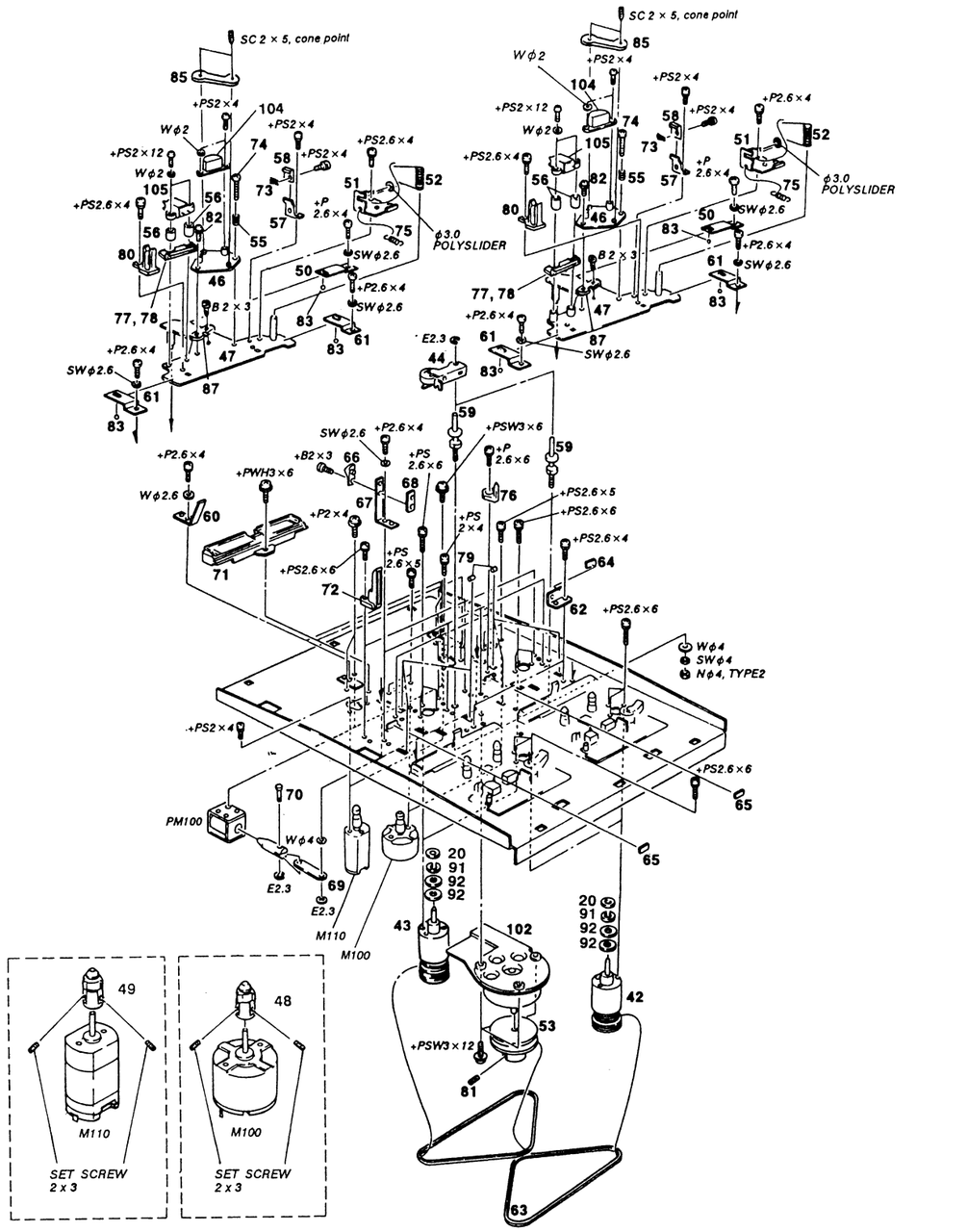
Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

SECTION 10
EXPLODED VIEWS

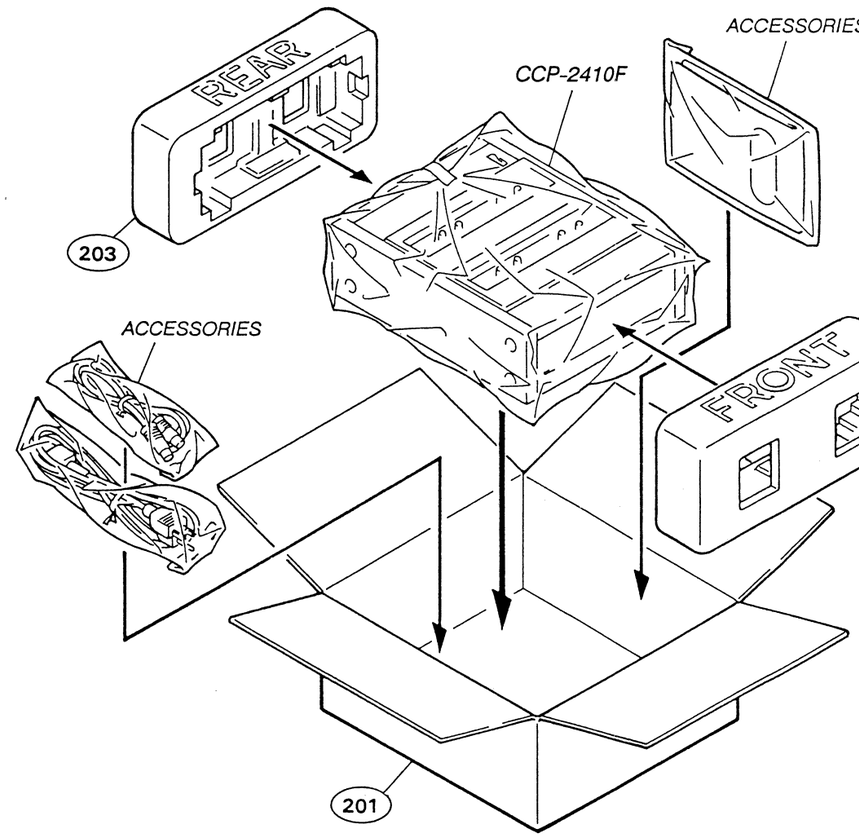




2)


SC 2 × 5, cone point
W φ2
+PS2 × 4
+PS2 × 12
+PS2.6 × 4
+P 2.6 × 4
φ3.0 POLYSLIDER
SW φ2.6
B2 × 3
E2.3
+PSW3 × 6
+P 2.6 × 6
+PS 2.6 × 6
+PS 2 × 4
+PS2.6 × 5
+PS2.6 × 6
+PWH3 × 6
+B2 × 3
W φ2.6
W φ4
SW φ4
N φ4, TYPE2
PM100
M110
M100
SET SCREW 2 x 3

3)


REAR
CCP-2410F
ACCESSORIES
FRONT
203
202
201

(1)

Ref. No. or Q'ty	Part No.	SP	Description
11	X-3167-339-1	o	PANEL ASSY,METER
12	X-3167-340-1	o	PANEL ASSY,SWITCH
13	X-3162-347-2	o	PANEL ASSY,SIDE
15	3-151-905-12	o	HINGE,DOOR
20	3-162-415-01	s	WASHER,THRUST
22	3-164-239-01	o	BRACKET(RIGHT),PC BOARD
23	3-164-240-01	o	BRACKET(LEFT),PC BOARD
24	3-164-242-01	o	SPACER,SWITCH
25	3-164-261-11	o	PANEL,FRONT
26	3-164-262-12	o	PANEL,REAR
27	3-164-265-61	o	PANEL,CASSETTE
28	3-164-265-71	o	PANEL,CASSETTE
29	3-164-266-01	o	PLATE,BOTTOM
30	3-564-027-01	o	FELT,LIMITER
31	3-668-743-00	o	NUT,PLATE,ROLLER,PRECEDING
32	3-682-047-01	o	HOLDER(A),PC BOARD
33	3-176-199-01	o	BRACKET(LEFT),PC BOARD
34	3-176-200-01	o	BRACKET(RIGHT),PC BOARD
35	3-164-260-01	s	FOOT,RUBBER
36	3-694-825-11	s	SCREW(M3)(STEP),SPECIAL HEAD
37	3-164-251-01	o	SUPORT,PC BOARD
38	3-164-252-01	o	HEAT SINK
39	3-170-051-01	o	PLATE,SHIELD

(2)

Ref. No. or Q'ty	Part No.	SP	Description
20	3-162-415-01	s	WASHER,THRUST
42	A-2109-009-A	o	CAPSTAN(B) ASSY(COPY3)
	A-2109-011-A	o	CAPSTAN(C) ASSY(COPY4)
43	A-2109-011-A	o	CAPSTAN(C) ASSY(COPY1)
	A-2109-009-A	o	CAPSTAN(B) ASSY(COPY2)
44	X-3162-306-1	s	PINCH ROLLER ASSY
46	X-3162-343-1	o	PLATE ASSY,ADJUSTMENT,HEAD
47	X-3162-344-2	o	CHASSIS(R) ASSY,HEAD(COPY1-4)
48	X-3162-348-1	o	TABLE(RIGHT) ASSY,REEL
49	X-3162-349-1	o	TABLE(LEFT) ASSY,REEL
50	3-162-312-01	o	SPRING
51	3-162-345-02	o	HOOK,SPRING
52	3-162-399-01	s	SPRING
53	3-164-221-01	s	PULLEY,MOTOR
55	3-164-232-01	s	SPRING,COMPRESSION
56	3-164-233-01	o	SPACER,ERASE HEAD
57	3-164-234-02	o	BRACKET,BRUSH
58	3-164-235-01	o	RETAINER,BRUSH
59	3-164-236-01	o	SHAFT,PINCH ROLLER
60	3-164-237-01	o	SPRING,CASSETTE RETAINER
61	3-164-238-01	o	RETAINER(B),HEAD CHASSIS
62	3-164-241-01	o	BRACKET,BRUSH
63	3-164-243-01	s	BELT,CAPSTAN
64	3-164-244-01	s	STOPPER,HEAD CHASSIS
65	3-164-245-01	s	CUSHION,CHASSIS
66	3-164-246-01	o	RETAINER,CASSETTE
67	3-164-247-01	s	SPRING,CASSETTE RETAINER
68	3-164-248-01	o	RETAINER,CASSETTE
69	3-164-249-01	o	PLATE SOLENOID
70	3-164-250-01	o	SHAFT,JOINT
71	3-164-259-01	o	CASSETTE,RETAINER
72	3-164-271-01	s	GUIDE,CASSETTE
73	3-164-272-02	s	BRUSH,ELECTROSTATIC PREVENTION
74	3-418-191-00	s	SCREW
75	3-165-191-01	s	SPRING,TENSION
76	3-491-131-00	s	PIN,CASSETTE GUIDE
77	3-166-369-01	s	SPACER,HEAD
78	3-166-369-11	s	SPACER,HEAD
79	3-558-448-00	s	ROLLER,HEAD CHASSIS
80	3-576-837-00	s	CLAMP,LEAD
81	3-701-509-00	s	SET SCREW,DOUBLE CUP 3x8
82	7-621-770-67	s	SCREW(M2.6x6),(+)SPECIAL HEAD
83	7-671-112-01	o	STEEL,BALL
85	3-165-188-01	s	SPACER(1),ADJUSTMENT PLATE
87	3-165-189-02	s	SPACER(2),ADJUSTMENT PLATE
91	3-162-416-01	o	RING(SHAFT),RETAINING C
92	3-701-439-21	s	WASHER

(3)

PACKING MATERIALS

Ref. No. or Q'ty	Part No.	SP	Description
201	3-176-137-31	o	INDIVIDUAL CARTON
202	3-164-215-01	o	CUSHION(FRONT)
203	3-164-216-01	o	CUSHION(REAR)

SUPPLIED ACCESSORIES

Ref. No. or Q'ty	Part No.	SP	Description
1set	X-3701-105-0	s	ROD ASSY,CLEANING,HEAD
1pc	⚠ 1-534-754-00	s	POWER CORD(FOR J MODEL ONLY)
1pc	⚠ 1-551-812-11	s	POWER CORD(FOR U MODEL ONLY)
1set	⚠ 1-590-910-11	s	POWER CORD,SET(FOR EK MODEL ONLY)
1pc	1-558-196-11	s	CORD,CONNECTION 13P
1pc	3-164-273-01	s	COVER,DUST
1pc	3-758-025-01	s	MANUAL,INSTRUCTION(LARGE) (FOR J MODEL ONLY)
1pc	3-758-025-11	s	MANUAL,INSTRUCTION(LARGE) (FOR U MODEL ONLY)
1pc	3-758-025-21	s	MANUAL,INSTRUCTION(LARGE) (FOR EK MODEL ONLY)

SECTION 11
ELECTRICAL PARTS LIST

PARTS INFORMATION

(1) Safety Related Components Warning
Components marked with ⚠ on the schematic diagrams, exploded views and electrical spare parts list are critical to safe operation. Replace these components with Sony parts whose part numbers appear in this manual or in service bulletins and service manual supplements published by Sony.

(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts witch actually in use due to "accommodating the improved parts and /or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors and Resistors
The following units may be assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.
Capacitors : μF
Resistors : Ω

補修用部品注意事項

(1) 安全重要部品
回路図, 分解図, 電気部品表中で⚠印付きの部品は, 安全性を維持するために重要な部品である。従ってこれらの部品を交換する時には, 必ず指定の部品を交換すること。

(2) 部品の共通化
ソニーから供給される部品はセットに実装されているものと異なることがある。
これは部品の共通化, 改良等によるものである。
分解図や電気部品表には現時点での共通化された部品が記載されている。

(3) 部品の在庫
部品表のSP (Supply code) 欄のoで示される部品は交換頻度が低い部品で, 在庫していないことがあり, 納期は長くなることがある。

(4) コンデンサ, 抵抗の単位
回路図, 分解図, 電気部品表中, 特に明記したものを除き, 下記の単位は省略されていることがある。
コンデンサ : μF
抵抗 : Ω

ELECTRICAL PARTS LIST

CN-14(S) BOARD

Ref. No. or Q'ty	Part No.	SP	Description
171	1-634-869-11	o	PRINTED CIRCUIT BOARD,CN-14(S)
CN6	1-562-090-00	s	JACK 13P
CN601	1-562-090-00	s	JACK 13P

LED-5 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
551	1-633-867-13	o	PRINTED CIRCUIT BOARD,LED-5
D1	8-719-313-21	s	LED SEL1321G,GRN

SW-7(S) BOARD

Ref. No. or Q'ty	Part No.	SP	Description
161	1-634-859-11	o	PRINTED CIRCUIT BOARD,SW-7(S)
CN1	1-560-461-00	o	PIN,CONNECTOR 5P
D1	8-719-311-21	s	DIODE SEL1121R,RED
D2	8-719-311-21	s	DIODE SEL1121R,RED
D3	8-719-311-21	s	DIODE SEL1121R,RED
D4	8-719-311-21	s	DIODE SEL1121R,RED

SY-3(S) BOARD

Ref. No. or Q'ty	Part No.	SP	Description			
521	A-2019-227-A	o	MOUNTED CIRCUIT BOARD,SY-3(S)			
6pc	⚠1-533-189-11	S	HOLDER,FUSE			
C1	1-126-256-11	s	ELECT	4700uF	20%	35V
C2	1-126-256-11	s	ELECT	4700uF	20%	35V
C3	1-126-256-11	s	ELECT	4700uF	20%	35V
C4	1-124-360-00	s	ELECT	1000uF	20%	16V
C5	1-124-618-11	s	ELECT	2200uF	20%	35V
C6	1-124-618-11	s	ELECT	2200uF	20%	35V
C7	1-124-618-11	s	ELECT	2200uF	20%	35V
C8	1-124-477-11	s	ELECT	47uF	20%	25V
C9	1-124-477-11	s	ELECT	47uF	20%	25V
C10	1-124-477-11	s	ELECT	47uF	20%	25V
C11	1-124-477-11	s	ELECT	47uF	20%	25V
C12	1-124-477-11	s	ELECT	47uF	20%	25V
C13	1-161-057-00	s	CERAMIC	0.033uF	10%	50V
C14	1-102-962-00	s	CERAMIC	30pF	5%	50V
C15	1-102-962-00	s	CERAMIC	30pF	5%	50V
C16	1-124-477-11	s	ELECT	47uF	20%	25V
C17	1-124-477-11	s	ELECT	47uF	20%	25V

(SY-3(S) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description			
C18	1-124-477-11	s	ELECT	47uF	20%	25V
C19	1-124-477-11	s	ELECT	47uF	20%	25V
C20	1-124-477-11	s	ELECT	47uF	20%	25V
C21	1-161-057-00	s	CERAMIC	0.033uF	10%	50V
C22	1-124-618-11	s	ELECT	2200uF	20%	35V
C23	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C41	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C42	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C51	1-124-618-11	s	ELECT	2200uF	20%	35V
C52	1-124-360-00	s	ELECT	1000uF	20%	16V
C61	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C62	1-130-495-00	s	MYLAR	0.1uF	5%	50V
C101	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C102	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C103	1-124-471-00	s	ELECT	1000uF	20%	6.3V
C201	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C202	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C203	1-124-471-00	s	ELECT	1000uF	20%	6.3V
C301	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C302	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C303	1-124-471-00	s	ELECT	1000uF	20%	6.3V
C401	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C402	1-130-487-00	s	MYLAR	0.022uF	5%	50V
C403	1-124-471-00	s	ELECT	1000uF	20%	6.3V
CF1	1-567-875-11	s	VIBRATOR,CERAMIC 2.27MHz			
CN1	1-564-242-00	o	PIN,CONNECTOR 5P			
CN2	1-508-736-00	o	PIN,CONNECTOR 10P			
CN4	1-564-320-00	o	PIN,CONNECTOR(B2P-VH) 2P			
CN6	1-560-470-00	o	PIN,CONNECTOR 8P			
CN101	1-560-469-00	o	PIN,CONNECTOR 6P			
CN201	1-560-469-00	o	PIN,CONNECTOR 6P			
CN301	1-560-469-00	o	PIN,CONNECTOR 6P			
CN401	1-560-469-00	o	PIN,CONNECTOR 6P			
CN602	1-560-456-00	o	PIN,CONNECTOR 2P			
D1	8-719-505-60	s	DIODE S5VB60			
D2	8-719-505-60	s	DIODE S5VB60			
D3	8-719-200-02	s	DIODE 10E-2			
D4	8-719-200-02	s	DIODE 10E-2			
D5	8-719-911-19	s	DIODE 1SS119			
D6	8-719-911-19	s	DIODE 1SS119			
D7	8-719-200-02	s	DIODE 10E-2			
D101	8-719-200-02	s	DIODE 10E-2			
D102	8-719-911-19	s	DIODE 1SS119			
D103	8-719-911-19	s	DIODE 1SS119			
D104	8-719-911-19	s	DIODE 1SS119			
D201	8-719-200-02	s	DIODE 10E-2			
D202	8-719-911-19	s	DIODE 1SS119			
D203	8-719-911-19	s	DIODE 1SS119			
D204	8-719-911-19	s	DIODE 1SS119			
D301	8-719-200-02	s	DIODE 10E-2			
D302	8-719-911-19	s	DIODE 1SS119			
D303	8-719-911-19	s	DIODE 1SS119			
D304	8-719-911-19	s	DIODE 1SS119			
D401	8-719-200-02	s	DIODE 10E-2			
D402	8-719-911-19	s	DIODE 1SS119			
D403	8-719-911-19	s	DIODE 1SS119			

(SY-3(S) BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
D404	8-719-911-19	s	DIODE 1SS119
D601	8-719-911-19	s	DIODE 1SS119
D602	8-719-911-19	s	DIODE 1SS119
IC5	8-759-913-42	s	IC PST520C-2
IC6	8-759-635-02	s	IC M50747SP-C42SP
IC8	8-759-701-75	s	IC NJM7805FA
IC101	8-759-984-03	s	IC LM339N
IC201	8-759-984-03	s	IC LM339N
IC301	8-759-984-03	s	IC LM339N
IC401	8-759-984-03	s	IC LM339N
PS1	⚠ 1-532-637-11	s	LINK,IC 1.0A
PS2	⚠ 1-532-679-21	s	LINK,IC 0.6A
Q1	8-729-900-80	s	TRANSISTOR DTC114ES
Q2	8-729-199-82	s	TRANSISTOR 2SD998
Q4	8-729-900-80	s	TRANSISTOR DTC114ES
Q5	8-729-900-80	s	TRANSISTOR DTC114ES
Q6	8-729-900-80	s	TRANSISTOR DTC114ES
Q102	8-729-140-93	s	TRANSISTOR 2SB733-34
Q103	8-729-900-61	s	TRANSISTOR DTA114ES
Q104	8-729-900-61	s	TRANSISTOR DTA114ES
Q112	8-729-140-93	s	TRANSISTOR 2SB733-34
Q113	8-729-900-61	s	TRANSISTOR DTA114ES
Q114	8-729-900-61	s	TRANSISTOR DTA114ES
Q121	8-729-900-61	s	TRANSISTOR DTA114ES
Q122	8-729-140-96	s	TRANSISTOR 2SD774-34
Q123	8-729-821-04	s	TRANSISTOR 2SA1317-STU
Q202	8-729-140-93	s	TRANSISTOR 2SB733-34
Q203	8-729-900-61	s	TRANSISTOR DTA114ES
Q204	8-729-900-61	s	TRANSISTOR DTA114ES
Q212	8-729-140-93	s	TRANSISTOR 2SB733-34
Q213	8-729-900-61	s	TRANSISTOR DTA114ES
Q214	8-729-900-61	s	TRANSISTOR DTA114ES
Q221	8-729-900-61	s	TRANSISTOR DTA114ES
Q222	8-729-140-96	s	TRANSISTOR 2SD774-34
Q223	8-729-821-04	s	TRANSISTOR 2SA1317-STU
Q302	8-729-140-93	s	TRANSISTOR 2SB733-34
Q303	8-729-900-61	s	TRANSISTOR DTA114ES
Q304	8-729-900-61	s	TRANSISTOR DTA114ES
Q312	8-729-140-93	s	TRANSISTOR 2SB733-34
Q313	8-729-900-61	s	TRANSISTOR DTA114ES
Q314	8-729-900-61	s	TRANSISTOR DTA114ES
Q321	8-729-900-61	s	TRANSISTOR DTA114ES
Q322	8-729-140-96	s	TRANSISTOR 2SD774-34
Q323	8-729-821-04	s	TRANSISTOR 2SA1317-STU
Q402	8-729-140-93	s	TRANSISTOR 2SB733-34
Q403	8-729-900-61	s	TRANSISTOR DTA114ES
Q404	8-729-900-61	s	TRANSISTOR DTA114ES
Q412	8-729-140-93	s	TRANSISTOR 2SB733-34
Q413	8-729-900-61	s	TRANSISTOR DTA114ES
Q414	8-729-900-61	s	TRANSISTOR DTA114ES
Q421	8-729-900-61	s	TRANSISTOR DTA114ES
Q422	8-729-140-96	s	TRANSISTOR 2SD774-34
Q423	8-729-821-04	s	TRANSISTOR 2SA1317-STU
Q601	8-729-900-61	s	TRANSISTOR DTA114ES
Q602	8-729-900-80	s	TRANSISTOR DTC114ES
Q603	8-729-900-80	s	TRANSISTOR DTC114ES
Q604	8-729-900-80	s	TRANSISTOR DTC114ES
Q605	8-729-900-80	s	TRANSISTOR DTC114ES
Q606	8-729-900-80	s	TRANSISTOR DTC114ES

Ref. No. or Q'ty	Part No.	SP	Description		
R1	1-249-441-11	s	CARBON	100K	5% 1/4W
R2	1-249-416-11	s	CARBON	820	5% 1/4W
R3	1-249-416-11	s	CARBON	820	5% 1/4W
R4	1-249-441-11	s	CARBON	100K	5% 1/4W
R5	1-249-429-11	s	CARBON	10K	5% 1/4W
R6	1-249-401-11	s	CARBON	47	5% 1/4W
R7	1-247-903-00	s	CARBON	1M	5% 1/4W
R8	1-249-429-11	s	CARBON	10K	5% 1/4W
R17	1-249-416-11	s	CARBON	820	5% 1/4W
R18	1-249-416-11	s	CARBON	820	5% 1/4W
R19	1-249-416-11	s	CARBON	820	5% 1/4W
R22	1-249-441-11	s	CARBON	100K	5% 1/4W
R102	1-249-417-11	s	CARBON	1K	5% 1/4W
R104	1-249-429-11	s	CARBON	10K	5% 1/4W
R105	1-249-396-11	s	CARBON	18	5% 1/4W
R112	1-249-417-11	s	CARBON	1K	5% 1/4W
R114	1-249-429-11	s	CARBON	10K	5% 1/4W
R115	1-249-416-11	s	CARBON	820	5% 1/4W
R116	1-249-429-11	s	CARBON	10K	5% 1/4W
R117	1-249-401-11	s	CARBON	47	5% 1/4W
R122	1-249-425-11	s	CARBON	4.7K	5% 1/4W
R202	1-249-417-11	s	CARBON	1K	5% 1/4W
R204	1-249-429-11	s	CARBON	10K	5% 1/4W
R205	1-249-396-11	s	CARBON	18	5% 1/4W
R212	1-249-417-11	s	CARBON	1K	5% 1/4W
R214	1-249-429-11	s	CARBON	10K	5% 1/4W
R215	1-249-416-11	s	CARBON	820	5% 1/4W
R216	1-249-429-11	s	CARBON	10K	5% 1/4W
R217	1-249-401-11	s	CARBON	47	5% 1/4W
R222	1-249-425-11	s	CARBON	4.7K	5% 1/4W
R302	1-249-417-11	s	CARBON	1K	5% 1/4W
R304	1-249-429-11	s	CARBON	10K	5% 1/4W
R305	1-249-396-11	s	CARBON	18	5% 1/4W
R312	1-249-417-11	s	CARBON	1K	5% 1/4W
R314	1-249-429-11	s	CARBON	10K	5% 1/4W
R315	1-249-416-11	s	CARBON	820	5% 1/4W
R316	1-249-429-11	s	CARBON	10K	5% 1/4W
R317	1-249-401-11	s	CARBON	47	5% 1/4W
R322	1-249-425-11	s	CARBON	4.7K	5% 1/4W
R402	1-249-417-11	s	CARBON	1K	5% 1/4W
R404	1-249-429-11	s	CARBON	10K	5% 1/4W
R405	1-249-396-11	s	CARBON	18	5% 1/4W
R412	1-249-417-11	s	CARBON	1K	5% 1/4W
R414	1-249-429-11	s	CARBON	10K	5% 1/4W
R415	1-249-416-11	s	CARBON	820	5% 1/4W
R416	1-249-429-11	s	CARBON	10K	5% 1/4W
R417	1-249-401-11	s	CARBON	47	5% 1/4W
R422	1-249-425-11	s	CARBON	4.7K	5% 1/4W
R601	1-249-413-11	s	CARBON	470	5% 1/4W
R606	1-249-429-11	s	CARBON	10K	5% 1/4W
R607	1-249-429-11	s	CARBON	10K	5% 1/4W
R608	1-249-429-11	s	CARBON	10K	5% 1/4W
R609	1-249-416-11	s	CARBON	820	5% 1/4W
R610	1-249-416-11	s	CARBON	820	5% 1/4W
RB1	1-235-195-00	s	RES BLOCK	10Kx8	
RB2	1-235-195-00	s	RES BLOCK	10Kx8	
RB3	1-231-533-00	s	RESISTOR BLOCK	10Kx4	
RB601	1-231-533-00	s	RESISTOR BLOCK	10Kx4	
S601	1-554-931-11	s	SWITCH,PUSH		
S602	1-554-931-11	s	SWITCH,PUSH		
S603	1-554-931-11	s	SWITCH,PUSH		
S604	1-554-931-11	s	SWITCH,PUSH		

FRAME

Ref. No. or Q'ty	Part No.	SP	Description
102	1-541-747-12	S	MOTOR,CAPSTAN
104	1-500-098-11	s	HEAD,MAGNETIC(RECORD) 098-11R
105	1-543-707-11	s	ERASE HEAD 707-11E
F1	⚠1-532-745-11	s	FUSE,GLASS TUBE 3.15A 125V (FOR J,U MODEL ONLY)
	⚠1-532-237-00	s	FUSE,TIME-LAG(BET) 3.15A 250V (FOR EK MODEL ONLY)
F2	⚠1-532-744-11	s	FUSE,GLASS TUBE 2.5A 125V (FOR J,U MODEL ONLY)
	⚠1-532-286-00	s	FUSE,TIME-LAG(BET) 2.5A 250V (FOR EK MODEL ONLY)
F3	⚠1-532-744-11	s	FUSE,GLASS TUBE 2.5A 125V (FOR J,U MODEL ONLY)
	⚠1-532-286-00	s	FUSE,TIME-LAG(BET) 2.5A 250V (FOR EK MODEL ONLY)
M100	1-543-163-51	s	MOTOR 163-51(RF-510T)
M200	1-543-163-51	s	MOTOR 163-51(RF-510T)
M300	1-543-163-51	s	MOTOR 163-51(RF-510T)
M400	1-543-163-51	s	MOTOR 163-51(RF-510T)
M110	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
M210	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
M310	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
M410	1-541-766-12	s	MOTOR,DC 766-12(EN22-R12NIB)
PM100	1-454-495-11	s	SOLENOID,PLUNGER
PM200	1-454-495-11	s	SOLENOID,PLUNGER
PM300	1-454-495-11	s	SOLENOID,PLUNGER
PM400	1-454-495-11	s	SOLENOID,PLUNGER
S1	⚠1-570-744-21	s	SWITCH,AC POWER
T1	⚠1-449-928-11	s	TRANSFORMER,POWER (FOR J,U MODEL ONLY)
	⚠1-450-145-11	s	TRANSFORMER,POWER (FOR EK MODEL ONLY)
	1-690-979-11	o	CABLE, CONNECTION 12P (FOR RECORD HEAD)

(151) AC-3 BOARD (FOR J,U MODEL ONLY)

(SAME AS CCP-2310F)

(151) AC-5 BOARD (FOR EK MODEL ONLY)

(SAME AS CCP-2310F)

(501) AU-171 BOARD

(SAME AS CCP-2310F)

(511) AU-172 BOARD

(SAME AS CCP-2310F)

(531) EX-4 BOARD

(SAME AS CCP-2310F)

CCP-2310F (和, 英)
CCP-2410F (和, 英)
9-977-563-01

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